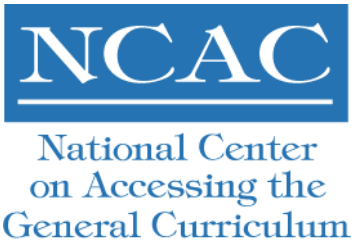

NCAC

Curriculum Access for Students with Low-Incidence Disabilities: The Promise of Universal Design for Learning

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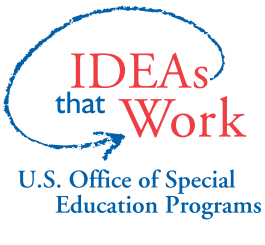

Curriculum Access for Students with Low-Incidence Disabilities: The Promise of Universal Design for Learning

Written by Richard M. Jackson, Director of Practice and CAST's Liaison to Boston College for the National Center on Accessing the General Curriculum

Edited by Valerie Hendricks

This report addresses the following questions:

- What is Universal Design for Learning (UDL)?
- What are low-incidence disabilities?
- Why are schools and communities particularly challenged in serving students with low-incidence disabilities?
- What are the needs of students with low-incidence disabilities?
- What curricula and instructional practices are currently used with students with low-incidence disabilities?
- What planning models are in use for students with low-incidence disabilities?
- How can IEPs ensure greater access to the general curriculum for students with low-incidence disabilities?
- What approaches exist for enabling students with low-incidence disabilities to participate in state- and district-level assessment systems?
- How can the UDL framework increase access to the general curriculum for students with low-incidence disabilities?

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Table of Contents

Introduction

Twenty years ago, the publication of *A Nation At Risk* instigated two decades of educational reform in the United States. Yet improving our educational system remains a national priority. Today, various school reform efforts brought about by enabling legislation and funding streams are converging on the goal of providing a single high-quality education for all of America's students. Expectations of excellence and equal access, as well as a focus on outcomes, are driving the effort to "leave no child behind." The goal of much of this reform work is to ensure that children of color, children living in poverty, children learning English as a second language, and children with disabilities encounter no barriers as they receive the best education possible in order to become independent, productive, and participating members of the communities in which they will live as adults.

Once, the "factory" model of schooling in America viewed all children as mere "raw material" to be measured and then either mainstreamed or side-tracked, with children disadvantaged by color, poverty, language, or disability automatically winding up outside the mainstream. This system of sorting and then tracking children institutionalized inequality and denial of opportunity. Reform efforts of today are directed toward eliminating this *ad hoc* marginalization of groups of children, such as those listed above, who are viewed as "at risk" in America's schools. Reforming education, improving schools, and raising student achievement are noble and socially just pursuits, but by what means are these lofty goals to be accomplished?

Many of the diagnostic and prescriptive approaches of the past have resulted in practices where presumably the least capable receive significantly less curricula. An alternative approach to understanding student learning difficulties becomes available when assessments are applied to a school itself, or, more particularly, to a school's curriculum, instead of to students. Measurement can then proceed with the following questions: *How accessible and user-friendly is the curriculum? To what extent does the curriculum permit multiple entry and exit points? To what degree does the curriculum allow for wide participation? How accurately and fairly does the curriculum assess student progress?*

In order to make a single high-quality public school education available to all, the curriculum itself must be examined. The typical lecture-and-textbook curriculum, made accessible only to those who could demonstrably benefit from it, implies that any failure to grasp the material calls for the student him- or herself to be examined for flaws, as has traditionally been the case. Failure to examine the curriculum and to consider modifications to it presents a crucial question: *are the problems confronting public schools today rooted in the students or in the curriculum?* In the following pages, we take the position that the challenge of educating students with disabilities or students who are not achieving rests with the curriculum, not with the student. In particular, we posit that the problem resides within the static presentation of typical curriculum, which is unresponsive to the many and varied ways in which individual learners differ.

In order to begin addressing not the deficits of students but rather the barriers erected for them by traditional curriculum, a framework is required for examining the curriculum as it is and for suggesting ways in which it may be made most accessible to all students. One such framework is Universal Design for Learning (UDL) (Rose & Meyer, 2002). UDL takes a trifold approach to assessing curriculum as it examines, first, the ways in which content can be represented; second, the means by which students can respond; and third, the conditions under which students can engage in the learning process. UDL anticipates an increasingly digitized information source for curriculum, which allows a UDL framework to guide the development of future digital media, delivery mechanisms, and technology tools for use in education. Today, an object as static as a textbook can be transformed in seemingly limitless ways when presented digitally (such as audio, CD-ROM, HTML). As schools become more inclusive and democratic institutions, and as technology develops exponentially, unprecedented opportunities lie ahead for all students to reach high standards in their learning and to experience a high quality of life in adulthood.

In the discussion that follows, we present practices that hold promise for increasing access to the general education curriculum for our nation's most vulnerable populations of students with disabilities. It is the general curriculum that prepares children to take on independent, responsible, and productive roles as adults. The general curriculum—delivered

through publicly-funded schools (and therefore by or through democratic institutions)—affords a central opportunity for all to pursue the American dream. For students who are blind, deaf, multiply disabled, or significantly developmentally delayed, equal opportunity to pursue that dream is out of reach without advances in how we prepare and employ our teaching force, how we set policy that raises standards and expectations without discrimination, and, above all, how we deliver a curriculum that is flexible and widely accessible for all learners.

Equal access to the general curriculum implies that all students have the right to strive for the same educational goals. Equal opportunity implies that accommodations are in place to remove or minimize the impact of disability on authentic performance, thus leveling the playing field. Equal opportunity also implies that modifications to entry points to and benchmarks of the curriculum can be made so that students with disabilities are enabled to make progress to the maximum possible extent. The central question at hand is how communities and state and local education authorities organize to provide the best education possible for students with low-incidence disabilities. One answer is that public education, equally afforded to all, can be accomplished through collaboration among stakeholders, including families, educators (both special and general), administrators, and policy-makers. We will demonstrate how adherence to a UDL framework for curriculum reform can yield a flexible and accessible curriculum for all students, including those with disabilities.

Overview

When Congress reauthorized the Individuals with Disabilities Education Act in 1997 (IDEA ’97), conditions were set for profound change in the ways disability is viewed in the broader context of schools and society. Originally, in the mid-1970s, Congress acted to ensure that no child, regardless of extent of disability, could be denied a free, appropriate, and public education (FAPE) in the least restrictive environment. At that time, an “appropriate” education meant a special education—one that would be individually designed to address the needs that result from disability. Now, more than thirty years later, the law states that no child may be denied access to the general education curriculum—specifically, that curriculum which schools and school districts make available to all non-disabled students (IDEA ’04).

Currently, the general curriculum consists of core subject areas plus varying elective subject options. Broad frameworks for core content areas are more or less determined by individual states, which also set requisite standards for grade advancement and graduation. In the larger, national effort to reform education in general, students with disabilities are not to be denied access to the same opportunities afforded their non-disabled schoolmates. In this way, Congress seeks to align opportunities for students with disabilities with those available to the non-disabled student population. Using broad-scale assessment systems, states now measure the extent to which all students, and the schools they attend, achieve intended outcomes. There is less emphasis on analyzing the discrepancy between what schools actually provide and what they intend to provide (inputs) in favor of greater focus on results as measured by standards attainment (outputs). Better results for schools presumably lead to better adult outcomes for students. Just as schools are held accountable for student learning through standards testing, so too will schools be held accountable for supports and services they provide for students with disabilities in order to allow them to access the general curriculum. Accordingly, students with disabilities are now compelled by IDEA '97 and subsequent amendments to participate in all state- and district-level assessment systems.

Today, the touchstone of special education law remains the Individualized Educational Plan (IEP), which is a document detailing the range and intensity of services and supports intended for each eligible student with a disability. Unlike in the past, however, the IEP now formalizes the collaborative relationship between general and special education and also aligns the general curriculum with specially-designed instruction and other support structures necessary for enabling access to the curriculum. Some support structures relate to how instruction accommodates a student's disability without altering standards (e.g., extra time allotted for task completion, Braille in place of print). Other supports may involve curriculum modifications that adjust performance levels or entry points but continue to address standards' content domain or framework. Accommodations or modifications stipulated in an IEP to adjust instruction or adapt curriculum for a student also apply to the administration of state- and district-level assessments. For students with significant developmental delays, accommodations alone may be neither sufficient nor appropriate. Alternatively, states and districts may employ alternate assessments to ascertain the extent to which students meet goals delineated on their IEPs. Alternate assessments in these cases are modifications of state standards, but they nonetheless follow the broad

frameworks identified for each state's core knowledge areas. Alternate assessment procedures can be authentic and performance-based. In frequent use are portfolios, evaluated according to rubrics that reveal the depth to which students meet standards. Alternate assessment procedures are labor intensive both to design and to carry out. Scoring by state authorities is also laborious and time-consuming. Presumably, however, the use of alternate assessments is limited to 1–3% of school-aged children, thus minimizing the extent of onerous time and effort. Moreover, time spent by teachers in initially documenting alternate assessments is well invested, as procedures become more routine over time with an IEP's implementation.

To many, this adherence to states' curriculum standards for students with significant developmental delays appears unrealistic, but, clearly, Congress' intent in IDEA '97 and IDEA '04 is to remove barriers that historically limit access to the same curriculum taught to non-disabled students. This amounts to a zero-reject from the general curriculum so that all students must participate in and make progress within the general curriculum to the maximum extent feasible. If one conceives of the general curriculum as the vehicle through which all students can achieve adult outcomes—outcomes understood in a broad sense as independence, participation, and productivity—then, in a just and democratic society, opportunity cannot be denied for students with disabilities.

In the discussion that follows, we examine practices intended to improve access to the general curriculum for students with low-incidence disabilities. For many reasons, this population presents unique and daunting challenges for all committed to meeting IDEA '97's mandates. We follow a question-and-answer format in order to address key issues and to arrive at basic understandings concerning students with low-incidence disabilities. Since much of this report refers to a UDL framework, UDL will be defined. Low-incidence disabilities are then contrasted with high-incidence disabilities to uncover some distinguishing characteristics of this population. Next, particular challenges confronting schools and communities that endeavor to serve these students and their families are examined. We then concentrate on identifying the needs of students with low-incidence disabilities. We also present disability-related needs that are unique to a particular category of specific disability and other, more generic needs that cut across categories. The reason for this is the fact that IDEA retains the use of specific disability categories for eligibility determination and classification. Over the past few decades, however,

both professional literature and actual practice have supported alternative approaches for defining and classifying students with low-incidence disabilities. Thus, in order to provide students with low-incidence disabilities with appropriate and effective services, supports, and ancillary aids, it is necessary to examine alternative frameworks, differing from those traditionally in place, for understanding needs.

Specialized curricula and instructional practices that hold particular promise for students with low-incidence disabilities are presented. Just as it is important to understand need from multiple perspectives, so too must curriculum and instructional practices be understood as meeting both unique as well as shared needs among students with low-incidence disabilities. We focus on curricula and practices that are highly specialized as well as those that address more typically shared needs.

Because IDEA requires access to the general education curriculum for all students, it is necessary to examine ways in which specialized curricula and instructional practices can support or otherwise connect with broader approaches for improved access, participation, and progress for students with disabilities. Curriculum is highly complex. Historically, it has been examined through many different lenses. The complicated nature of curriculum theory and practice makes it difficult to envision innovative ways of making it accessible for students with disabilities. Thus, we will also examine and attempt to demystify some of that complexity.

Instructional practices presented in the context of our discussion are intended to bring an effective focus to eliminating or reducing curriculum needs associated with low-incidence disabilities. As with the consideration of need, curricular options and instructional practices can also be both highly specialized to a specific disability and highly generic across disabilities. For example, approaches for engaging students who are blind or deaf can be quite unique to those disabilities, given the varieties of existing communication modes. Other approaches can be quite generic, involving, for example, applied behavior analysis or systematic instruction.

After grounding in student need, curriculum, and instructional techniques, we examine models for collaborative planning. Students with low-incidence disabilities require services and supports beyond the classroom. These may intensify at various transition points throughout a life

span and broaden out to include an array of community agencies. We examine the IEP in turn as a tool for pulling services together in support of access to the general curriculum. We then focus on approaches for enabling students with low-incidence disabilities to participate in state- and district-level assessment systems. Finally, we conclude with a consideration of how access to the general curriculum can be improved for students with low-incidence disabilities through the application of principles of universal design.

I. What is Universal Design for Learning (UDL)?

A major premise of this report is that access to the curriculum for students with low-incidence disabilities is greatly enhanced by universal design. Universal Design for Learning (UDL) is a particular framework that applies to education. More specifically, UDL is an approach that can guide curriculum reform. A universally-designed curriculum includes multiple means of representation (to allow various ways of acquiring information and knowledge), multiple means of expression (to allow alternatives for demonstrating knowledge), and multiple means of engagement (to challenge appropriately, to motivate, and to allow learners to express and participate in their interests). A number of current contrasting approaches to universal design will be described. We conclude with an explanation of UDL. This will allow the reader to keep UDL in mind while progressing through subsequent sections until UDL solutions for curriculum access are more closely examined in our conclusion.

Origins of Universal Design

Architecture reveals the extent to which humankind can establish dominion over the natural environment by harnessing resources that it has to offer. Architectural design can be subjected to all manner of criteria, including beauty, convenience, utility, durability, safety, and even exclusivity. Only in recent times has the criterion of exclusivity been successfully challenged. As populations grew, built environments afforded travel and facilitated commerce. The need for standards in architectural design became apparent as built environments became interconnected. Architects needed to consider the preferences and capabilities of those who would access built environments. In more recent times, users of built environments were living longer and, therefore, functioning with less mobility and stamina. Notions of democracy and community were transforming views of belonging and participation. During the 1960s, social movements that began in Europe around such concepts as *normalization, deinstitutionalization,* and *communitization* were beginning to have a profound impact upon those who would advocate for the disabled in the United States. Thus, the needs of people who would potentially access the built environment were beginning to be understood as complex and diverse.

Universal Design in Architecture

The passage of the Vocational Rehabilitation Act of 1973 essentially outlawed discrimination on the basis of disability. So far-reaching was this piece of federal legislation that it took nearly three years for a beleaguered Congress to write the regulations that would ostensibly remove architectural barriers from all publicly supported buildings and properties. During this era, universal design in architecture was born. Like the dream of building inclusive communities for all to enjoy equally, universal design is an ideal with a process to ensure maximum participation for all. The challenge of removing physical barriers and retrofitting solutions to barriers proved to be a costly and cumbersome process, often yielding unsatisfactory results. Universal design sought to embed solutions into features at the design level—features that would benefit all, not merely accommodate the few. Curb cuts intended for wheelchair users, for example, were also found to be helpful for users of baby strollers, shopping carts, skateboardes, among others.

In 1990, the Americans with Disabilities Act (ADA) extended the prohibition against discrimination on the basis of disability to the private sector, requiring all entities doing business with the public to make every *reasonable accommodation* in providing access. Accessibility standards, while necessary for guidance and compliance monitoring, can appear onerous or threatening in light of the fact that they are government regulations, particularly when coupled with the public's misperceptions regarding disability. Universal design, as envisioned by Ron Mace and his colleagues at North Carolina State University's Center for Universal Design, was intended to promote the design of products and environments that would appeal to all. North Carolina State's Principles of Universal Design are listed below in brief form (without associated guidelines).

"PRINCIPLE ONE: Equitable Use
The design is useful and marketable to people with diverse abilities.

PRINCIPLE TWO: Flexibility in Use

The design accommodates a wide range of individual preferences and abilities.

PRINCIPLE THREE: Simple and Intuitive Use
Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

PRINCIPLE FOUR: Perceptible Information
The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

PRINCIPLE FIVE: Tolerance for Error
The design minimizes hazards and the adverse consequences of accidental or unintended actions.

PRINCIPLE SIX: Low Physical Effort
The design can be used efficiently and comfortably and with a minimum of fatigue.

PRINCIPLE SEVEN: Size and Space for Approach and Use
Appropriate size and space is provided for approach, reach, manipulation, and use, regardless of user's body size, posture, or mobility."

Principles of Universal Design, version 2.0 (Center for Universal Design, North Carolina, 1997).

Application of these principles has established a framework for developing design standards in architecture, as well as for creating consumer products, that permit the greatest degree of access and usability for the widest possible range of individuals. Today, millions of Americans with disabilities enjoy access to buildings, restaurants, movie theatres, sporting events, transit properties, walkways, commercial vehicles, and bank teller machines—to name only a few venues that were once inaccessible to them. Wheelchair users, once limited to home

instruction or restricted to special school buildings, now attend their neighborhood schools alongside their non-disabled agemates.

However, although physical access to classrooms and other education facilities is an important first step toward educational equity for the disabled, it is not sufficient to ensure that all students with disabilities have equal access to the general curriculum or enjoy comparable opportunity to derive benefit from what school curriculum has to offer. Additional changes in the classroom environment and in the curriculum itself are also required in order for full equity to be achieved.

Universal Design in Education

Universal design in architecture recognized the importance of building environments that were more in line with the needs of an aging population and the requirements of those persons with disabilities who were being welcomed into the general community during the 1970s. In the 1980s, attention was brought to bear on the rapidly increasing diversity of America's students through the publication of *A Nation At Risk,* a report presented to the U.S. Department of Education by the National Commission on Excellence in Education. According to this report, our nation's schools—particularly in urban centers—appeared ill-equipped to prepare a diverse population to compete successfully in an increasingly global economy. The findings of the Commission spurred a wave of reform initiatives with enabling legislation aimed at raising standards and outcomes for our nation's most under-served students. More recent federal legislation, such as No Child Left Behind (NCLB, 2001) and the Individuals with Disabilities Education Act (IDEA, 1997; 2004), seeks to build one education for all students, improve teacher quality, align curriculum with standards, measure outcomes at multiple points, and hold schools accountable for student performance. For no child to be excluded from—or left behind by—the general curriculum, the curriculum itself must be examined and re-designed from a fresh perspective, much in the same way that buildings, environments, and products were critically examined by the original advocates of universal design in architecture resulting in important and lasting changes in building standards.

Colleagues at the University of Connecticut's National Center on Postsecondary Education and Disabilities have developed a set of principles building upon and extending the principles originated at North Carolina State's Center for Universal Design. Note that their educational design principles are essentially the same as those outlined by North Carolina State for architectural and product design (with the addition of principles 8 and 9—community of learners; instructional climate). Their new principles address more educational constructivist perspectives regarding communities of learners and a climate of high expectations and social interaction. Together, these principles set a framework for what Scott, M^{c}Guire, and Shaw (2001) call Universal Design for Instruction (UDI). Application of these principles allows postsecondary institutions in particular to dramatically widen the accessibility of course offerings by designing accommodations into course structures rather than retrofitting a series of educational work-arounds to try and meet the specialized needs of individual students after course materials have been prepared. UDI principles are listed and defined in Appendix B.

Universal Design for Learning (UDL)

Calls for critically examining curriculum from a universal design perspective have come from many quarters (King-Sears, 2001; Hitchcock, 2001; Nolet & M^{c}Laughlin, 2000; Pugach & Warger, 2001; Rose & Meyer, 2002; Turnbull, et al., 2002; Wehmeyer, et al., 2002). The principles of Universal Design for Learning (UDL) as put forth by the Center for Applied Special Technology (CAST, Inc.) were first presented in an Office of Special Education Programs (OSEP) Topical Brief (Orkwis & M^{c}Lane, 1998). Currently, typically taught curriculum in schools is a "one-size-fits-all" curriculum, best exemplified by the ubiquitous textbook. It generally lacks flexibility in how it presents information to students, how it permits students to respond, and how it engages students in the learning process. In order for typical textbooks and other curriculum materials to become accessible to many disabled students, they must undergo numerous time-consuming transformations and interpretations, to the extent that the student's participation in classroom activities is often fragmented or delayed.

Several projects supporting universal design and access approaches to the general curriculum were reviewed in *Research Connections* (Danielson, 1999), a bi-annual review of

OSEP-sponsored research on topics in special education. Prominently featured were projects underway at CAST to create a universally designed early literacy curriculum (Scholastic's WiggleWorks) and a universally designed document processor (CAST's eReader). Also featured in the review was a framework advanced by the University of Oregon's National Center for Improving the Tools of Education (NCITE) for designing the 'architecture' of effective instructional practices (Kaméenui & Simmons, 1999). (Their design principles for lesson adaptations are available as Appendix C.)

CAST's work is important because it demonstrates how flexible and malleable curriculum can be with the use of digital media and digital technology tools following a UDL framework. The NCITE's work on the architecture of instruction is important because it draws upon the current knowledge base regarding effective instructional practices and illustrates how instruction can be tailored to learners depending on the degree of explicitness required.

Over the years, many proposals have emerged to counter the old factory model approach to mass education begun in the 19th century with graded education. Approaches to individualized, personalized, or otherwise differentiated instruction have made enormous contributions to thinking about teaching and learning processes. What might distinguish UDL from other efforts to improve instruction in general—or other perspectives on universal design in particular—is that UDL establishes a framework for curricular reform in education (Rose & Meyer, 2002) yet also recognizes the need to maintain a balance between curriculum and instructional practice (Hitchcock, 2001). Moreover, a UDL framework provides a perspective for collaborative teams of special and general education personnel to provide access to the general curriculum while addressing disability-specific needs in multi-level or inclusive classroom situations (Jackson & Harper, 2002).

While UDL anticipates the coming digital curriculum with its inherent potential for flexibility and built-in options, it is not wholly reliant upon technology. UDL can ensure accessibility with new media and technology tools, but it depends upon the application of evidenced-based teaching practices to yield desired results (Hitchcock, 2002). To achieve these results, a UDL framework relies upon three guiding principles—multiple means of

representation, multiple means of expression, and multiple means of engagement—for the development of flexible teaching approaches and curriculum resources. These principles emanate from analyzation of available research on the brain and new conceptualizations of how neuroscience informs our appreciation of learning and knowing (Rose & Meyer, 2000). Areas in the brain that contribute to learning can be grouped roughly into three interconnected networks, each with a fundamental role in learning: (a) "recognition" networks, specialized to receive and analyze information (the "what" of learning); (b) "strategic" networks, specialized to plan and execute actions (the "how" of learning); and (c) "affective" networks, specialized to evaluate and set priorities (the "why" of learning) (Rose & Meyer, 2002).

New insights into neurological systems working within these three regions of the brain connected with learning has led to the formulation of the three guiding principles of UDL:

1. To support diverse *recognition* networks, provide multiple, flexible methods of presentation. For example, when introducing students to a new concept or unit, a teacher may provide multiple structures to present that information, such as a lecture, a digitized text, an activity-based exploration, a demonstration.

2. To support diverse *strategic* networks, provide multiple, flexible methods of expression and apprenticeship. For example, when a teacher requests student responses to demonstrate understanding and knowledge, he or she could provide a range of tools that allow students to respond in various formats, such as in writing, orally, with a slide show, with a video, with a drawing.

3. To support diverse *affective* networks, provide multiple, flexible options for engagement. Allow students to select an area of interest within a topic or concept to research or study. For example, allow students to select one of the natural resources in a geographic area under study to research rather than assigning resources (Rose & Meyer, 2002).

UDL also establishes a framework for providing access to, participation in, and progress within the general curriculum as first mandated by IDEA '97. Hitchcock, Meyer, Rose, and Jackson (2002) have defined four main components of the general curriculum:

1. goals and milestones for instruction (often in the form of a scope and sequence),
2. media and materials to be used by students,
3. specific instructional methods (often described in a teacher's edition), and

means of assessment to measure student progress.

Each component can be transformed for accessibility and participation by all students by adherence to the principles of UDL.

UDL offers new ways to think about teaching and learning. Students with sensory challenges, for example, require curriculum that contains alternative approaches for presenting information. Students with motor challenges, on the other hand, may require curriculum that provides alternative ways of expressing what they know and can do, while students along the autism spectrum may require curriculum that contains alternative ways to become engaged in or connected with the learning process. Broadly stated learning goals may allow students who are cognitively challenged to enter the curriculum at points where appropriate levels of challenge and support can yield both tangible and measurable results. Methods and materials with designed-in supports may permit wider access and greater participation in the general curriculum by all students, including those with disabilities. Instructionally embedded assessments may provide more immediate feedback and more frequent data points for progress monitoring and instructional decision-making. These are some of the promises of UDL.

II. What are low-incidence disabilities?

Alternative Systems for Classification

Students with disabilities can be classified in many ways. IDEA '97 continues to recognize disabilities in the form of more or less discrete diagnostic categories, such as mental retardation, specific learning disabilities, or emotional disturbance. Other approaches to classification include categorizing disabled individuals by degree of severity of their needs, or by how atypical an individual may be when compared to a norm. Still other approaches may emphasize the level of intensity of supports necessary for an individual to function optimally in home, school, community, and work settings.

Each of these approaches has advantages and disadvantages. The *categorical* approach taken by IDEA may emphasize learner characteristics for each disability, but, in so doing, it could also foster a self-fulfilling prophecy in which all members of a group sharing a categorical label, in a sense, become that label. A *severity* approach may emphasize developmental milestones at the expense of ignoring strengths in functional skills. An *intensity* approach may meaningfully focus on levels of needed support, but, at the same time, limit opportunities for an individual to move to a less restrictive setting. None of these systems of classifying individuals with disabilities are either entirely satisfactory or entirely lacking in merit. For educators, it is important to be aware that several systems of categorizing students with disabilities exist simultaneously, because eligibility criteria, placement alternatives, intervention strategies, and teaching credentials may all vary substantially from school to school, depending on which system of classification is currently being employed.

A Focus on Incidence

When the issue at hand for students with disabilities centers on the provision of services in local schools, the availability of qualified personnel and the technical sophistication of necessary resources must be carefully considered. In order to provide students with disabilities

with a free and appropriate public education, it is useful to classify learners in terms of *incidence*, or how many students with any particular disability or combination of disabilities reside in a community. Under such a system, students with the most commonly-seen disabilities may be more appropriately served by local public schools while students with relatively rare disabilities may not find adequate resources or highly qualified personnel.

High-incidence disabilities include—

- communication disorders (speech and language impairments)
- specific learning disabilities (including attention deficit hyperactivity disorder [ADHD])
- mild/moderate mental retardation
- emotional or behavioral disorders

Low-incidence disabilities include—

- blindness
- low vision
- deafness
- hard-of-hearing
- deaf-blindness
- significant developmental delay
- complex health issues
- serious physical impairment
- multiple disability
- autism

None of the disabilities listed under low-incidence disabilities generally exceed 1% of the school-aged population at any given time. The relative rarity of students with these disabilities in public schools often poses significant challenges for local schools struggling to meet their needs. Since they encounter these students so infrequently, most local schools have little if any knowledge of how to best educate these students, of what technologies are available to assist them, and of how to obtain needed and appropriate support services from outside agencies. All

students with low-incidence disabilities thus experience a commonality: they are difficult to serve in current local public school programs.

III. Why are schools and communities particularly challenged in serving students with low-incidence disabilities?

Insufficient Numbers

Students with low-incidence disabilities are difficult to serve in today's public schools because none of the low-incidence categories alone can form a group large enough to warrant the presence of full-time, school-based, and highly specialized personnel, except in the largest of big-city school districts. Therefore, students with low-incidence disabilities are more likely to be served in less inclusive settings (such as in special classes, separate schools, and residential facilities) than are students with high-incidence disabilities. Local schools that do attempt to provide maximum inclusion most often support these efforts through the use of itinerant personnel, usually teachers/consultants who travel from school to school as needed, often crossing district lines to serve the needs of their students.

Each variety of low-incidence disability brings its own unique challenges to a local school system. When intensive, specialized instruction is required, such as the learning of Braille for blind students or American Sign Language (ASL) for the deaf, teacher consultation models of intervention can prove woefully inadequate for the delivery of specially-designed and carefully-targeted intensive instruction. Similarly, when faced with students who present with complex healthcare needs, local schools frequently lack the capacity to respond appropriately to medical emergencies or to provide required routine intensive care. Each group of students with a low-incidence disability has its own set of specialized needs, requiring specialized supports and specially-trained personnel to maximize their educational opportunities. While some generic support services are of use to nearly all students, most are specialized to one group. For example, a deaf or autistic child is unlikely to need to learn Braille, while a blind student will not need the level of constant medical support that a quadriplegic child or one under medical treatment for leukemia is likely to require.

The low-incidence nature of these disabilities also makes it extremely challenging to maintain an adequate supply of qualified professionals to serve them. The skills and knowledge sets of these professionals are highly technical, requiring a significant commitment of time and effort to acquire through professional preparation, typically at university centers. Yet the caseloads of these professionals are small and likely to change in composition from year to year. Further added to this supply challenge is the paucity of university-based, professional preparation programs to prepare sufficient numbers of practitioners to adequately serve these students. Moreover, administrative supervision and mentoring of new inductees to the field are frequently inadequate. These professionals are mostly isolated from colleagues, limiting their opportunity for collaboration and shared growth. Opportunities for targeted professional development may be extremely limited. In sum, it is difficult to attract qualified individuals into these fields to begin with and perhaps even more difficult to nurture, support, and retain them once employed.

Finding the Least Restrictive Environment

Often, the least restrictive environment for students with low-incidence-disabilities cannot be found in their local public school. While IEP teams must presume that a student is to be placed in the public school closest to her or his home, a team may be compelled by assessment findings to urge placement in a specialized setting where highly-trained personnel and appropriate technologies can be concentrated and unique needs can be appropriately targeted for intensive instruction. Although students with low-incidence disabilities are required to have access to the general education curriculum, that requirement does not state that the only way in which such a condition may be met is in a full-inclusion setting in a general education classroom. An IEP team may determine that an alternative and highly specialized setting is the most appropriate, and therefore least restrictive, placement available for meeting the specific needs resulting from a student's disability(ies), particularly if their local public school is not sufficiently equipped to provide a safe and successful educational experience for that student. Thus, in many cases of students with low-incidence disabilities, the true path toward greatest access to the general education curriculum may be pursued more appropriately in a separate setting (for example, in a school for the deaf or a residential school for the blind).

However, in some cases, appropriate program planning for students with low-incidence disabilities in local public schools is possible and may be the preferred placement according to the IEP team, which includes the student and the student's family. Adequate provision for these students in inclusive settings requires broad community engagement and significant systems change. Collaboration and commitment among stakeholders at the local, state, and federal levels are necessary to effect such change. With thoughtful and appropriate approaches to planning, such as those to be described, willing communities can amass the supports necessary to ensure high-quality educational services for even those students with the most significant cognitive disabilities or complex healthcare needs.

IV. What are the needs of students with low-incidence disabilities?

Special Education is Not a Place

With the enactment of IDEA '97, special education is no longer considered a place but rather a network of services and supports designed to enable students to derive full benefit from a public school education (Heumann & Hehir, 1997). As stated earlier, this does not mean that students with disabilities cannot be appropriately served in specialized settings. Rather, the intent of the law is to emphasize that "placement" or location of services is the last decision an IEP team makes during a team assessment and planning process. In earlier times, a disability-specific label itself would dictate placement, and that placement would define the treatment or nature of interventions for students. Today's approaches use comprehensive and holistic assessments to reveal the extent of need in suspected areas of risk associated with a student's disability. Their team then determines the setting in which needed services can best be provided, selecting from a continuum or array of placement options ranging from full inclusion in a general education classroom to residency in a hospital setting (Drasgow, Yell, & Robinson, 2001). An IEP team always starts with the presumption that a student will be placed in the same setting in which he or she would be educated if disability were not an issue, namely, a regular public school classroom (Turnbull & Turnbull, 1998). Thus, in order to place a student in a less inclusive setting, this starting presumption must be rebutted by assessment data before such a placement outside a general education setting can be made.

Categories and Characteristics

IDEA designates categories of disability with which specific learner characteristics have been associated in the special education knowledge base (Hallihan & Kaufman, 2002; Hardman, et al., 2002; Heward, 2003; Turnbull, et al., 2002). These characteristics are correlates of particular disabilities and not necessarily connected with a particular disability—that is to say, they are characteristics that are commonly found in students with these particular disabilities, but

for which there are often exceptions, such as cases where a student has a particular disability but not one or more of its expected associated characteristics or behaviors. "Learned helplessness," for example, is associated with specific learning disabilities, but not all students with learning disabilities have acquired this psychological adaptation. Rather, they are *at risk* for acquiring learned helplessness. While there are often litanies of learner characteristics described as unique or disability-specific, the extent to which these areas of risk are observed in an *individual* student can vary widely. Careful assessment and observation of an individual student and his or her needs must be undertaken to document *actual* need for initial intervention and not merely *expected* need. Such an assessment establishes a baseline of educational need(s) against which progress can be measured.

Students with disabilities often become "handicapped"—unnecessarily or unfairly restricted—not by their disabilities in and of themselves, but by the environment in which they live, learn, and relate. Consequently, extent of need cannot adequately be assessed without consideration of broader contexts in which an individual lives. This context includes family, community, and the local public school which would be a student's default placement location. Thus, a team's determination of the least restrictive and most appropriate environment for a student must take all these factors into consideration when judging the capacity or preparedness of home, community, and local school to support and nurture a student in areas of assessed need and in assuring a student access to the general curriculum. It is imperative that any set of disability-specific needs not serve to stereotype a student, to lower expectations for a student, or to contribute to negative self-fulfilling prophecies for a student. So-called unique or disability-specific needs should be taken only as *possible* areas of risk for IEP teams to investigate, not inevitable features automatically conjoined to a specific disability in question.

Addressing Intense and Complex Needs

Identified needs of students with low-incidence disabilities are frequently complex and multiple (Browder, 2001). Addressing severe and complex needs of students is challenging for family, school, and broader community. Since the ultimate goal of education is community inclusion and high quality of life, an appropriate education must contain opportunities for each

individual to achieve independence, enjoy community participation, and increase productive and rewarding work to the maximum extent possible. Most children identified by IDEA categories as having low-incidence disabilities possess sensory, motor, or neurological deficits, and, consequently, they are typically identified and managed early in their lives through a medical model. Families of infants and toddlers with established risks receive early intervention services, most generally under the auspices of state departments of public health. Such services prepare a family and their local community to understand and cope with the impact of a child's disability on their lives. Such services also prepare a family to actively participate in the planning and decision-making processes that accompany transitional events throughout the child's life. Thus, early intervention and early childhood education can be effective in preventing or minimizing many long-term and predictable consequences of disability.

Because of the possibility of mitigating many of the consequences of disability early on in a child's life, possibly to the point where a disability essentially vanishes, IDEA encourages states to withhold disability categorization until age nine. The more generic term *developmental delay* is used instead, to avoid the stereotyping and lowered expectations that follow disability-specific labeling. However, states still have the option of using, for example, the terms "blind" or "deaf" if preferred. According to IDEA '97),decisions made about a child with a disability must be informed by "persons knowledgeable about the disability" or by "qualified professionals." States must "qualify" professionals through certification or licensure. Thus, for blind students to receive specially-designed instruction in Braille literacy, deaf students in ASL, and motor-impaired students in augmentative communication, states must ensure that an adequate supply of appropriately prepared professionals is available to support such students in educational programs. The need for the specialized knowledge and skills possessed by these professionals is often cited as a basis for retaining IDEA's system of categorical labeling, as well as states' systems for categorical teacher certification (Hallihan & Kaufman, 2002).

Clusters of Low-Incidence Disabilities

Hereafter, low-incidence disabilities are defined and described under the following headings:

- Blind/Low Vision
- Deaf/Hard-of-Hearing
- Deaf-Blind
- Significant Developmental Delay
- Significant Physical and Multiple Disability
- Autistic Spectrum

Note that some of these headings do not match with IDEA's current categories, being more general. Where appropriate, legal categorical definitions are quoted from IDEA '97 in the text so that readers will note congruence with federal law.

Blind/Low Vision

According to IDEA '97,

> Visual impairment including blindness means an impairment in vision that, even with correction, adversely affects a child's educational performance. The term includes both partial sight and blindness.

Authority: 20 U.S.C. 1401(3)(A) and (B); 1401(26)

Historically, students with visual impairment have been referred to as blind, visually handicapped, visually disabled, visually impaired, partially sighted, partially blind, visually limited, or sight impaired. To understand the needs of students with visual impairments, the following factors must be taken into account: age at onset of visual impairment, degree of impairment, site of impairment, prognosis for improvement or degeneration in condition, day-to-day stability of condition, individual tolerance for visual fatigue, and the extent and complexity of any co-existing additional impairments.

Blind children are particularly challenged in understanding and moving about in physical space (Blasch, Wiener, & Welch, 1997). Without opportunity to directly observe space during locomotion, blind children have difficulty mentally representing and manipulating spatial

concepts. They are also challenged in obtaining, manipulating, and producing many types of information, such as text, graphics, facial expressions, and gestural cues (Swensen, 1999). Achieving self-esteem is also difficult for blind children since self-awareness in the social context of school is often affected by such factors as social isolation, low expectations, and over-protection (Tuttle & Tuttle, 1996).

Classroom instruction typically exploits the visual/motor channel of communication and relies upon social mediation for student achievement. Because blind students cannot partake of the visual channel of communication and are often socially isolated, they generally have limited opportunities for incidental learning. This places them at a disadvantage when attempting to participate in classroom activities. Often gaps exist in concept development, making it difficult for classroom teachers to activate prior knowledge, or leading them to make false assumptions in regard to the fundamental understanding these students have of the world around them. Moreover, the need for Braille as a necessary alternative to print creates a challenge for general education classroom teachers to provide invaluable corrective feedback, as very few general education classroom teachers can read and write Braille. Lack of eye contact and the impossibility of visually-based social recognition can have a profound impact on a blind student's opportunity to form meaningful and cooperative relationships with peers. Such barriers must be carefully examined and skillfully addressed by practitioners in order to provide genuine and valid access to the general curriculum for blind students.

Deaf/Hard-of-Hearing

According to IDEA '97,

> Deafness means a hearing impairment that is so severe that [a] child is impaired in processing linguistic information through hearing, with or without amplification, that adversely affects a child's educational performance.
>
> Hearing impairment means an impairment in hearing, whether permanent or fluctuating, that adversely affects a child's educational performance but that is not included under the definition of deafness in this section.

Authority: 20 U.S.C. 1401(3)(A) and (B); 1401(26)

Needs of children who are hearing impaired must take into account factors such as age at onset of disability (in particular, pre-lingual *vs.* post-lingual deafness), audiometric hearing status (particularly in speech range with amplification), type of hearing loss (conductive, sensorineural, mixed, central) and possible presence of concomitant disabilities. The needs of children who are deaf and children who are hard-of-hearing must be understood as quite distinct when considering communication use. The native language of deaf children is American Sign Language (ASL), but children who are hard-of-hearing may understand speech with amplification and may not identify with members of Deaf culture.

Severity of hearing loss is measured by decibels (dB) or units of loudness. A hearing loss between 15 and 20 dB is considered slight. A person with a hearing loss of 60 dB has difficulty hearing conversational speech without amplification. An individual with a hearing loss of 100 dB is not able to hear a power lawnmower without amplification (Kirk, Gallagher, & Anastasiow, 2000).

Children and adults with hearing disabilities characteristically confront significant issues with regard to social and intellectual development, speech and language development, and educational achievement. Reviews of the research on intellectual characteristics of children with a hearing impairment suggest that distribution of intelligence or IQ scores is similar to their hearing counterparts (Gargiulo, 2003.) Any difficulties in performance appear to be closely related to speaking, reading, and writing the English language, but not to level of intelligence (Paul & Quigley, 1990). Children who are identified as deaf and taught a sign language before the age of two perform much better on all tasks than those identified after reaching age two Kirk et al., 2000).

For those with a hearing impairment, particularly children who are born deaf, speech and language skills are the areas of development most severely affected. The majority of deaf children have a very difficult time learning to use speech (Gargiulo, 2003; McLean, Bailey, & Wolery, 1996); children who are deaf exhibit significant articulation, voice quality, and tone

discrimination difficulties—even babies who are deaf, whether born deaf or becoming deaf as early as 8 months of age, appear to babble less than their hearing peers (Allen & Schwartz, 1996; Gargiulo, 2003).

Two main ways in which students with hearing impairments communicate are through oral means (by speech or lip-reading) and manual means (sign language) (Wood, 2002). Students who communicate through manual methods use the American Sign Language (ASL) system. This is a system of hand and arm movements, positions, and gestures that translate spoken words into visual representations. If parents do not help their child(ren) form gestures that are part of the standard ASL lexicon, they may develop their own sign system, called 'home sign' (Kirk, et al., 2000).

Social and emotional development for hearing-impaired children depends heavily on their ability to use communication skills. In a classroom setting, students with hearing impairments may have difficulty following simple directions; may use impaired or unclear speech; may be more attentive to faces than to other informational cues during conversation; may avoid situations that require talking and listening; may be very sensitive to bright colors and objects; may be very aware of any change in décor; may have unusual reactions to loud, dull noises; may respond to vibrations of low-flying airplanes or heavy trucks; and may seem shy and withdrawn from other children (Wood, 2002). All of these behaviors can interfere with optimal social and emotional development.

Classroom teachers routinely exploit the auditory-vocal channel of communication during instruction. This heavy reliance upon speaking and listening in a typical classroom limits access to the general curriculum for deaf students. Since ASL is the native language of the Deaf, students who have never had the benefit of hearing English language are notably challenged in learning written English as a second language, particularly in the areas of Language Arts and other literacy areas. This challenge is exacerbated by the lack of correspondence between written English and American Sign Language, as ASL has its own distinctive form or syntax which does not match that of English. In addition, many of the subtleties and nuances of English are ordinarily discovered through social interactions; without conversational facility and direct

access to spoken English, deaf students are at a distinct disadvantage in accessing the components of the general curriculum that rely on reading and understanding English.

Deaf-Blind

According to IDEA '97,

> Deaf-blindness means concomitant hearing and visual impairments, the combination of which causes such severe communication and other developmental and educational needs that cannot be accommodated in special education programs solely for children with deafness or children with blindness.
>
> Authority: 20 U.S.C. 1401(3)(A) and (B); 1401(26)

The federal definition of deaf-blindness stresses its uniqueness as contrasted with deafness or blindness. Apart from the uniqueness of deaf-blindness in and of itself are various ways in which the disability manifests itself. For example, Rubella syndrome may produce a sensorineural hearing loss and congenital cataracts, but may also result in central nervous system dysfunctions and cardiac problems. Ushers syndrome initially appears as a profound hearing loss and in adolescence results in loss of peripheral vision. CHARGE syndrome adds yet other physical and intellectual dimensions to visual and hearing challenges. When considering the needs of these students, age at onset, progression of sensory loss, and severity of sensory impairment must all be carefully examined.

Classroom inclusion is extremely challenging for students who are deaf-blind. A combination of vision and hearing impairment limits use of auditory/vocal and visual/motor channels of communication. Lack of opportunity to move about freely and to communicate can result in extreme isolation. Except for students with sufficient residual vision and hearing, it is difficult to view the typical classroom as providing a least restrictive environment for students who are deaf-blind, as substantial supports for mediating the social, communication, and mobility needs of students who are deaf-blind must be carefully planned and implemented for curriculum access and participation to occur.

Significant Developmental Delay

According to IDEA '97,

Mental retardation means significantly sub-average general intellectual functioning, existing concurrently with deficits in adaptive behavior and manifested during the developmental period, that adversely affects a child's educational performance.

Authority: 20 U.S.C. 1401(3)(A) and (B); 1401(26)

Here, significant developmental delay refers to a subgroup of IDEA's category of mental retardation. Individuals with significant developmental delays require greater intensities of supports than the majority of students with mental retardation.

Historically, children with mental retardation (MR) made up the largest special needs population. Today, MR is understood from many different perspectives. By definition, people who are mentally retarded demonstrate significant sub-average performance on standardized tests of intelligence. Intelligence is commonly understood as an underlying quality or trait inferred from behavior observed to be "smart." When measured as IQ, this trait is seen as a quantity that increases with age and levels off with maturity. Debate exists over this construct of intelligence, resulting in controversy over its measurement, mutability, plasticity, and structure.

The percentage of children identified as mentally retarded has declined over the years as eligibility according to IQ shifted from one to two units of standard deviation, effectively eliminating 13% of otherwise qualified cases under the normal curve. The permanence of mental retardation has been challenged in recent history as well. In 1992, the American Association on Mental Retardation (AAMR) proclaimed that individuals who overcome deficits in adaptive behavior might no longer be considered mentally retarded despite their performance on standardized tests of intelligence. According to the U.S. Department of Education's Office of Special Education Program's (OSEP) 22nd Annual Report to Congress—

> Prior to the passage of P.L. 94-142, the educational prospects for children with disabilities were bleak. This was particularly true for children with mental retardation and other severe developmental disabilities, many of whom were institutionalized. Today most of those children can expect to live at home, and many receive special education and related services in regular schools. For example, by 1997–98, just 8% of children with significant developmental disabilities[1] were served in separate schools or in residential facilities.

Mental retardation, also known as developmental disability or significant cognitive impairment, can be viewed from a variety of perspectives but always involves limited cognitive capacity. Cognitive capacity can be understood in terms of degrees of severity or levels of intensities of supports necessary to live independently in natural or assisted environments. Of particular importance is the context in which deficits in adaptive behaviors become manifest. That is, what are the functional or whole-life consequences of mental retardation?

Again, the needs of students identified as mentally retarded vary according to many factors. In general, the greater the severity or limitations of a disability, the greater the emphasis has been on developing functional and life skills rather than setting more academic goals. Hallahan and Kaufman (2002), Heward (1996), and Hunt (1999) have discussed readiness skills and functional academics as curriculum goals, emphasizing the acquisition of those skills that can be used in everyday home, community, and work environments. According to Matson (1990), the presence of deficits in independent living skills should be a focus of active teaching to promote independent living. A focus on adaptive skills fosters self-reliance.

Colette and Tompkins (1999) recommend focusing on the critical environment in which a student is expected to function and identifying those specific skills or activities deemed necessary for a student to participate more successfully in those identified environments. Colette and Tompkins also emphasize the importance of addressing the social and emotional needs of students who are mentally retarded. Students often need assistance with focusing simultaneously

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[1] This figure includes students with autism, deaf-blindness, mental retardation, multiple disabilities, and orthopedic impairments.

on multiple social cues and in selecting appropriate social strategies. Improving social-perception and strategy-generation skills in these students is critical. Many agree that specialized instruction in the area of social cognitive processes is needed to prepare these students to successfully adapt to a dynamic and increasingly diverse social environment. Because of their cognitive limitations, some students with mental retardation may continue to require a high degree of on-the-spot direction from teachers or peers regarding how to interpret or respond to specific social situations (Leffert, Siperstein, & Millikan, 2000). A focus on executive control, self-direction, and transfer/generalization of skills and strategies is often necessary (Sands, 2000). Turnbull (et al., 2002) and Heward (1996) stress the need for a strong sense of self-determination, personal development, and access to leisure and travel to improve quality of life for these students.

The *low-incidence* aspect of mental retardation concerns individuals who depart extremely from the norm in terms of general intellectual functioning. These are students who have an intensive need for support, may also have complex health issues, and require a substantially modified curriculum. Effective progress for these students requires a blending of expanded or augmented curricular options with appropriate entry points in the various domains making up the general education curriculum. Several models (*see* VI. What planning models are in use for students with low-incidence disabilities?) exist for planning this blending of curriculum content options for students with significant developmental delay. The main challenge is to build a system of services and supports for implementing instruction while at the same time imparting the value of self-determination and self-reliance so that skills acquired will transfer into real-world community settings.

Significant Physical and Multiple Disabilities

According to IDEA ’97,

> Orthopedic impairment means a severe orthopedic impairment that adversely affects a child’s educational performance. The term includes impairments caused by congenital anomaly (e.g., clubfoot, absence of some member, etc.), impairments caused by disease (e.g., poliomyelitis, bone tuberculosis, etc.), and

> impairments from other causes (e.g., cerebral palsy, amputations, and fractures or burns that cause contractures).
>
> Authority: 20 U.S.C. 1401(3)(A) and (B); 1401(26)

Subsumed under this heading are students who fall under IDEA '97's categories of orthopedic impairments and multiple disabilities.

As this definition suggests, students with orthopedic impairments may vary considerably in the nature and severity of their disabilities. Many orthopedic impairments do not limit students' academic performance (Sherrill, 1993). However, the age at which a disability occurs, its underlying cause, and the presence of secondary disabilities (if any) may affect a student's need for special education and related services. For example, the age at onset of a disability and the suddenness with which it occurred may affect a student's adjustment. Students whose disabilities occur or develop when they are children may miss valuable opportunities for social development through play with same-age peers. Students with orthopedic impairments resulting from disease may have ongoing health concerns that affect their educational performance (Dunn, 1997).

According to IDEA '97,

> Multiple disabilities means concomitant impairments (such as mental retardation-blindness, mental retardation-orthopedic impairment, etc.), the combination of which causes such severe educational needs that they cannot be accommodated in special education programs solely for one of the impairments. The term does not include deaf-blindness.
>
> Authority: 20 U.S.C. 1401(3)(A) and (B); 1401(26)

Significant physical and multiple disabilities represent a highly heterogeneous body of students with vastly different yet overlapping needs. The need for medically-related assistance and

supports are common among these students. The extent to which highly technical and intensive supports can be effectively provided in local public schools raises questions about the appropriateness of inclusive programming for this group. Still, some children with orthopedic impairments, whose educational opportunities were formerly restricted to home instruction or hospital settings, may now participate fully in general education classroom activities with the removal of architectural barriers that were once commonplace in traditional classrooms and school buildings.

For example, children with severe forms of cerebral palsy, a neuromuscular orthopedic condition, may present very intensive special needs requiring technology, multidisciplinary service delivery, and medical assistance. Children with multiple disabilities may also present complex medical and health-related issues. They may have severe cognitive challenges in combination with sensory and motor disabilities.

The needs of children with significant physical and multiple disabilities vary widely. Students with a simple physical disability such as a missing limb will be very easy to include in a general educational setting with basic technical help, perhaps including a prosthesis and adaptive training; while a student who has cerebral palsy and is also blind presents a much greater challenge to inclusion. Obviously, the physical environment of a classroom and school may need to be modified to allow for accessibility and the opportunity for a student to develop independence (Lewis, 1999; Heward, 1996). Students may need specialized and/or adapted equipment to enhance or maximize use of their skills. Often a student's family needs to learn how to care for them at home and how to access services and other resources available to aid in daily living. A student's family also often needs information regarding available treatments and service options (Colette, 1999). Again, the degree to which these and other supports are required varies widely depending on the exact extent and nature of a student's disability(ies).

To the extent possible, physical and emotional independence, autonomy, and self-advocacy are desirable goals (Hallahan & Kauffman, 2000). Students may need help in developing a satisfactory level of self-esteem (Wood, 1997). Students with multiple physical disabilities may need cognitive, communicative, and affective assistance and strategies to reach

their greatest potential (Sands, 2000). Academic growth may require adapted instruction to meet their needs, as well as career education and life-skills training (Heward, 1996; Lewis, 1999). Teachers and other personnel who work with these students need to maintain open communication with their families and notify them of changes in attention or in physical and intellectual functioning (Wood, 1997).

Autistic Spectrum

According to IDEA '97,

> Autism means a developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age 3, that adversely affects a child's educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences. The term does not apply if a child's educational performance is adversely affected primarily because the child has an emotional disturbance, as defined in paragraph (b)(4) of this section.
>
> A child who manifests the characteristics of "autism" after age 3 could be diagnosed as having "autism" if the criteria in paragraph (c)(1)(i) of this section are satisfied.
>
> Authority: 20 U.S.C. 1401(3)(A) and (B); 1401(26)

Today, autism is understood not as a single condition but as a spectrum of pervasive developmental disorders (PDDs) that include classic autism, Asperger's syndrome (autism in individuals without language delay or intellectual disability), and Rett syndrome (degenerative disorders leading to autism), among others (Dempsey & Foreman, 2001). Most individuals with autism display significant impairments in communication, daily living skills, and social skills. Approximately 75% of autistic individuals function on a retarded level with cognitive ability

closely paralleling their level of autism (Waterhouse & Morris, et al., 1996). Main characteristics of autism include deficits in social interaction, language, and play, and deficits in behavior manifested as self-stimulatory behavior and/or perseverance with a narrow range of routines or interests (Dempsey & Foreman, 2001).

Wood (1997) discusses the need for auditory training and controlled exposure to sensory experiences to reduce averse reactions to sensory stimuli among some students with autism. Others discuss the need for life skills and vocational preparation, focusing on work habits and responsibilities (Turnbull, et al., 2002; Hunt & Marshall, 1999). Still others stress the need for functional academics that will allow children with autism to develop skills that are useful in daily life (Heward, 2002; Turnbull, et al., 2002). In addition, Colette and Tompkins (1999) state that families of children with autism may need individualized programs to help them best meet the needs of their child

Considering Generic Needs

Thus far, we have discussed the needs of students with low-incidence disabilities as they have been defined by IDEA category and then subsumed under broader headings or clusters. Traditionally, understanding of the needs of students with disabilities originated from a medical or deficit model. IDEA has since transformed this interpretation of needs into a more functional/educational model. For example, blindness and deafness are not defined by sensory acuity but rather by observing functional and educational implications of sensory impairments. By observing the discrepancy(ies) between the demands of an educational setting and a student's functional capabilities, the impact of a disability can be clinically derived. For students with more severe or multiple disabilities, a procedure known as developmental diagnosis was originally employed in which observed behaviors of students were compared with norms obtained across various developmental domains (Stephens, 1971). Developmental schedules contain sequences of skills that normally appear in order. Once a student's developmental level was established, targets for instruction were then selected and prioritized based on the next, unattained developmental milestone.

This bottom-to-top approach proved painstakingly slow. By the late 1980s it was feared that students would be "aging out" of special education programs without the necessary skills to transition to the world of work and daily life (Will, 1986). Ecological assessment soon took precedence over developmental diagnosis as a tool for determining needs of students with severe and complex disabilities. Referencing behaviors against the requirements of independent functioning in real contexts yields far more practical and functional targets on which to focus instruction. Such an approach begins with desired outcomes and indicators of high-quality living. Understanding need from such a perspective focuses less on unique deficits and more on needs held in common. Needing a place to live, work, and participate in society to the maximum extent possible represents a desired set of outcomes for such an approach. The discussion of curriculum and teaching strategies that follows reflects this perspective that while students who have low-incidence disabilities often have unique needs, they also hold much in common.

V. What curricula and instructional practices are currently used with students with low-incidence disabilities?

When construed broadly, intended outcomes of the general curriculum for students with low-incidence disabilities do not differ essentially from those expected for all students. Community inclusion, with the opportunity to achieve a high quality of life, is the ultimate goal for all citizens. State curriculum frameworks in core content areas, local content options, and district-level vision and mission statements about stakeholders' aspirations for students—all drive the general curriculum. Right down to the level of the community school, the question is, *How might that curriculum be accessed by students with disabilities? How can participation be accomplished and effective progress be ensured?* While specialized curricula and instructional practices must continue to be employed to address disability-specific needs, today the unique needs of students with disabilities must be understood in a broader context of the general curriculum.

Curriculum and Instructional Practices

Curriculum and instructional practices are not easily separated conceptually one from the other. In the present context, *curriculum* is treated as content and *instruction* is meant as those teaching practices that engage students in curriculum. However, in reviewing the literature, disentangling the meaning of *curriculum* from *instruction* often proves unwieldy. Thus, for purposes of presentation, we combine both curriculum and instructional practices for each of the low-incidence disabilities discussed. While IDEA continues to classify students with disabilities according to category, in many instances curriculum and instructional practices can be applied more generically. Students with complex healthcare issues, significant developmental delays, and severe multiple disabilities require approaches that offer intensive levels of support. Students who are blind, deaf, deaf-blind, and autistic may in some cases require the same degree of support, but they also require more specialized curriculum and teaching approaches (in, for example, technology and literacy). Additionally, such students may require specialized resources from related service providers (such as orientation and mobility instructors or audiologists).

Below, an overview of the topic of curriculum is provided, it is defined, and issues of the day that surround it are discussed. Specialized curriculum and teaching practices for facilitating access to the general curriculum are discussed for students who are blind, deaf, deaf-blind, and multiple-disabled, followed by more generic curriculum and instructional practices that cut across the needs of students with more intensive special needs.

Planning for students with disabilities begins with curriculum (M^{c}Laughlin, 1999; Nolet & M^{c}Laughlin, 2000; Pugach, 2001; Wehmeyer, Sand, Knowlton, & Kozleski, 2002). Despite earlier calls for a curriculum focus (Warger & Pugach, 1993), special education developed as a field that concentrated less on curriculum and more on needs arising from disability. Most curriculum development in the early years of special education was done by state and local authorities (Meyen, 1996). Publishers simply were not interested in developing products for what was then a very limited market. In the 1960s, the United States federal government supported a number of projects to develop special curricula for students with disabilities. The Social Learning Curriculum (Goldstein, 1969), Project Math (Cawley & Vitello, 1972), the Pacemaker Primary Curriculum (Ross & Ross, 1972), and Project "I Can" (Wessel, 1975) are examples (Meyen, 1996).

With the advent of the Education for All: The Handicapped Children's Act of 1975, federal emphasis shifted from curriculum development to preparing and implementing individualized educational programs for students with disabilities (Meyen, 1996). Heavily influenced by behaviorism, these individualized programs focused on remedial skills prerequisite for progressive movement into the mainstream. According to Poplin and Stone (1992), task analysis, applied behavior analysis, and diagnostic/prescriptive instructional analyses became the mainstays of special education practice. Meyen observed, "If effective special education is primarily a consequence of curricular/instructional interventions, much of our recent history has been misdirected, and an emphasis on curriculum in the future is dictated" (Meyen, 1996).

Today, curriculum matters—as Pugach (2001) aptly states. But special educators are not accustomed, neither by training nor by inclination, to plan programs following state curricular frameworks of core subject areas (Fisher & Frey, 2001; Hock, 2000).

IEP teams today must begin with the presumption and high expectation that students with low-incidence disabilities can achieve state- and district-level standards (Wehmeyer, et al., 2002). Where special educators lack knowledge of curriculum content, they must seek out colleagues from general education or participate in more structural or systemic approaches for curriculum collaboration (Pugach & Warger, 1996). Collaboration through a shared commitment among general and special education personnel on IEP teams is crucial to develop and implement a plan that will ensure access, participation, and progress with the general education curriculum (Nolet & M^{c}Laughlin, 2000).

Toward a Definition of Curriculum

In order to understand and appreciate the meaning of and need for specialized curriculum, it is necessary to examine the notion of curriculum more generally. Scholars agree to disagree over a precise or uniform definition of curriculum. Nolet and M^{c}Laughlin (2000) differentiate between formal (curriculum theorists) and practical (public school personnel) definitions of curriculum. They observe that theorists refer inclusively to all experiences that students have under the auspices of schools when defining curriculum, while public school personnel operate under a narrower definition, referring almost exclusively to materials used in the classroom. Thus, school personnel tend to distinguish between curriculum (the "what" or substance of education) and instruction (the "how" of curriculum delivery or transmission).

Curriculum theorist Larry Cuban asserts that, at any given time, four different curriculums are in use in schools:

1. The *official curriculum*—what state and district officials set forth in curricular frameworks and courses of study

2. The *taught curriculum*—the part of the official curriculum that teachers actually choose to teach
3. The *learned curriculum*—the part of the official curriculum that students actually learn
4. The *tested curriculum*—the part of the official curriculum that is selected as representative of the entire body of material, and which "measures" absorption of that specific sub-set of curriculum material, as reflected through test scores

Part of Cuban's "learned curriculum" resembles what Philip Jackson (1968) describes as the "hidden curriculum," or what Eliot Eisner (1994) refers to as the "implicit curriculum." Eisner also adds "null curriculum" to his own definitions to make the point that students learn much from what is completely left out of their education. To the familiar "written, taught, and tested" curricula, Glatthorn (1999), in discussing the problem of curricular alignment, adds yet more manifestations of curriculum, such as the "hidden curriculum," (similar to Jackson's of the same name) the "recommended curriculum," the "excluded curriculum," the "supported curriculum," and the "learned curriculum." Clearly, there are many ways to view what schools offer students, whether intended or otherwise.

Howell and Nolet (2000) offer a palpable definition of curriculum that is amenable to operational definition:

> "A curriculum is a structured set of learning outcomes, or tasks, that educators usually call goals or objectives. Students are expected to learn the information specified in the curriculum so that they will have the skills needed to transition from childhood into adult life. Curriculum is intended to prepare students to succeed in society…. Consequently, the material in the curriculum comes from someone's analysis of what society requires for success."

Reduced to its simplest terms, curriculum provides the answer to the question *what should students know and be able to do as they progress through school?*

Facing the Challenge of Curriculum Access

Physical facilities, technology, media and materials, and human resources all contribute to the quality of what transpires in schools. Yet there remains great disparity in quality from community to community. And these disparities, in turn, yield uneven results for students from community to community. Such unevenness is particularly troubling when observed in communities with high concentrations of students from poor families, English language learners, or members of racial minorities. Also troubling is the achievement gap observed between disabled and non-disabled student populations (Benz, Lindstrom, & Yovanoff, 2000; Blackorby & Wagner, 1996). Standards-based reform and its reliance upon broad-scale assessment represents an attempt to improve overall performance of American students and to narrow the achievement gap observed in diverse student populations, including students with disabilities.

Pugach (2001) calls for a "curriculum-centered dialogue" that will enable general and special educators to confront several crucial and fundamental issues embedded in curriculum. These include the following:

1. The appropriateness and quality of the general education curriculum for all students
2. The degree to which the general education curriculum meets the needs of students from various cultural, linguistic, and socioeconomic backgrounds
3. The relationship of the curriculum to the disproportionate numbers of students of color in special education

All teachers inevitably ask *what do my students need to know and be able to do?* In order to answer these questions, teachers must identify, locate, or develop curriculum—that which is generally believed to constitute the "what" or substance of education. This substance of education can be taken apart and understood in many different ways. For example, curriculum can be divided into domains or subject areas. Some domains may be considered "core" or vital, while others may be considered "extra" or supplementary (e.g., extra-curricular activities). Curriculum can also be examined in terms of its scope, depth, or sequence.

Today, the aims or purposes of curriculum are stated in the form of "standards." For each domain, that which students need to know is often referred to as *content standards*, and that which students need to be able to do in order to demonstrate what they know is frequently called *performance standards*. Standards are generally sequenced so that entry-level or prerequisite knowledge, skills, and dispositions can be specified along paths or strands for each domain. Standards may be broadly stated or narrowly defined. (When broadly stated, standards permit flexibility in the multiple ways in which a standard can be achieved. When narrowly defined, standards may permit more precise benchmarking for indicating within a particular standard the level a student has achieved.)

Unlike other nations, standards for educational attainment in the United States are not uniformly set because education is neither prescribed nor controlled by a central government (Eisner, 2001). Rather, separate states set standards that frame the curriculum for local school districts to follow. States may vary in the precision with which they frame the curriculum. Thus, local communities may have more or less latitude in interpreting state standards.

State and federal legislation during the 1990s established a context for local refinement of curriculum. State improvement plans, school improvement councils, and district coordinating councils made up of stakeholders established a direction and a vision for the kinds of schools, services, and resources considered necessary to improve education at all levels. In the absence of a nationalized education system, communities can vary widely in what they offer students. In some instances, standards may be exhaustive and perhaps unrealistic in their attainability by all students (Marzano, 1999), or standards may be so limited as to constrain the scope and depth of what schools can offer (Kohn, 2000).

In the U.S., high quality education is everybody's concern. Thus, federal, state, and local communities, along with the private sector, share the cost of the operation of the American education enterprise. Concern during the early 1980s over America's capacity to compete in an increasingly global economy set the stage for a wave of reform initiatives in the form of federal legislation. For states and local communities to receive federal assistance for the improvement of education, states had to identify or develop content standards and assessment systems for

reporting the outcomes of federal investments in school reform. As stated, IDEA '97 mandated participation by students with disabilities in various reform efforts in order to ensure their opportunity to benefit from all that recent school reform had to offer. Access to, participation in, and progress within the general curriculum is a tall order indeed, further exacerbated by ambiguity in the definition of the general curriculum.

Blending General and Specialized Curriculum

Hitchcock, Meyer, Rose, and Jackson (2002) define the general education curriculum as the overall plan for instruction adopted by a school or school system. Nolet and M^{c}Laughlin (2000) acknowledge the uniqueness of the general education curriculum for each school system—and each student—when they recommend procedures for "finding" the general education curriculum. Wehmeyer (et al., 2002) acknowledges that the general curriculum is defined broadly because Congress intends for it to be determined locally. How students with disabilities ultimately access the general curriculum depends on the assessment, planning, and evaluation skills of their local IEP team members (consisting of both general and special educators). They need to examine the content of what is taught to non-disabled agemates, select entry points to the curriculum, determine appropriate accommodations for instruction and assessment, and determine curriculum modifications and alternates for assessment. They also need to determine what, if any, specially-designed instruction in expanded areas or domains of the curriculum is necessary to address needs arising from disability that also limit access to the general curriculum. Individual protections that reside at the heart of IDEA remain in place, so while curriculum is of primary importance, individual students will continue to be the focus of a free, appropriate, and public education (Turnbull & Turnbull, 1998).

What curriculum would support, complement, or augment student access to the general curriculum? For students with significant developmental or multiple disabilities, compilations of specialized curriculum have been published by Browder (2001) and by Ryndak and Alper (1996; 2003). These and other sources have been reviewed for inclusion in the low-incidence categories below. In the end, what students with low-incidence disabilities need to know and be able to do will depend on the expectations and standards embraced by their IEP team. A quality education

for students with low-incidence disabilities will be a blending of curriculum designed to address disability-specific or unique needs and curriculum designed for optimal functioning in a democratic society.

Blind/Low Vision

Curriculum for blind students was developed largely by residential schools during the 19th and early 20th centuries (Frampton, 1940). Content mirrored the curriculum of the day with significant alteration in teaching practices and communication systems for conveying that curriculum. Most notable is the use of Braille. Today, IDEA presumes that all students with IEPs who have vision impairments shall use Braille as their primary literacy medium unless the team determines that print is more efficient. Braille, however, was not always held in such high esteem. It took over 100 years—a period known as "the war of the dots"—for Braille to become established as the reading medium of preference for the blind.

Curriculum for students with low vision began to appear in the early part of the 20th century when so-called "partially sighted" children were separated from schools for the blind for educational purposes (Jackson, 1983). Due to concern that students with very high myopia (nearsightedness) would lose more vision through eyestrain, curriculum materials were enlarged and supplemented by aural reading (listening). This "sight saving philosophy," (Hathaway, 1959) as it was known, persisted well into the 1960s until Barraga's 1964 discovery that efficiency of vision improved through use. The new resulting "sight utilization philosophy" persisted into the 1980s, when declining Braille literacy rates among blind students were observed to correlate with unemployment. Hand in hand with the sight utilization philosophy was an increase in public day school attendance by blind students. Children who may have learned Braille at residential schools were now using enlarged print or print with optical magnification. In the minds of many advocates, this over-emphasis on the importance of sight utilization deprived many severely visually impaired students of the opportunity to learn Braille. Hence, the 1990s ushered in a new era of curriculum emphasizing Braille literacy (Rex, Koenig, Wormsley, & Baker, 1994).

Just as literacy is the focus of most of the current reform initiatives because of its connection with employment, so Braille literacy has taken center stage with the observation that

nearly ¾'s of blind people today are unemployed (Rabbi & Croft, 1989). In fact, fluent Braille users are among the most successfully employed blind sub-group. Reasons for the decline in Braille literacy among blind and visually impaired individuals are complex, but IDEA now requires that IEP teams undertake a learning media assessment (LMA) (Koenig & Holbrook, 1995) to determine the most efficacious approach to learning and literacy.

During the 1950s and 1960s, public day school programs for blind and visually impaired students expanded rapidly. Resource models, itinerant teaching services, and teacher-consultation models emerged and soon overtook residential school placement as the preferred approach for meeting blind students' educational needs. Prior to IDEA, advocates for public school programming downplayed or, at least, de-emphasized the unique and challenging needs of these students when entering the general educational environment. They argued that blind students needed the same curriculum as every other student and that teachers could supply just a few additional skills and resources (Abel, 1959). These additional skills and knowledge areas became known as the "plus curriculum." Today, the plus curriculum is known as the "expanded core" curriculum, to emphasize that it must go hand-in-hand with the "common core" curriculum (Hatlen, 1996a).

The expanded core curriculum is derived from the unique or disability-specific needs of blind and visually impaired students identified and elaborated by Hatlen and Curry (1987). The table below is adapted from Hatlen (1996b).

Core Curriculum for Blind and Visually Impaired Children and Youths

Existing Core Curriculum

English Language Arts	Other languages, to the extent possible
Mathematics	Science
Health	Physical Education
Social Studies	Fine Arts
Business Education	Economics
History	Vocational Education

Expanded Core Curriculum

Compensatory or functional academic skills, including communication modes*	Orientation and mobility
Social interaction skills	Independent living skills
Recreation and leisure skills	Career education
Use of assistive technology (AT)	Visual efficiency skills

*Note: For this area of the expanded core curriculum for blind and visually impaired students, a distinction must be made between compensatory skills and functional skills. Compensatory skills are those needed by blind and visually impaired students in order to access all areas of core curriculum. Mastery of compensatory skills will usually mean that a visually impaired student has access to learning in a manner equal to that of sighted peers. Functional skills refers to skills that students with multiple disabilities learn that provide them with the opportunity to work, play, socialize, and take care of personal needs to the highest level possible.

A short description for each area of expanded core curriculum is available as Appendix D.

Components of the expanded core curriculum present educators with a means of addressing the needs of visually impaired students who also have additional disabilities. The educational requirements of this population are often not met since their lack of vision is often considered "minor," especially when a child is severely impacted by cognitive and physical disabilities. Each area in an expanded core curriculum can be further defined to address educational issues confronting these children and to assist parents and educators to fulfill their needs.

Hatlen's (1996) expanded core curriculum was first brought to national attention by Corn, Hatlen, Ryan, and Siller (1995) in response to the Improving America's Schools Act of 1994. Corn (et al., 1995) has argued that states and school districts ought to be held accountable for ensuring that blind and visually impaired students receive adequate and appropriate instruction in these expanded core areas as well as in common core areas. Out of that work, a national agenda for educating blind and visually impaired children has identified a number of goals around which national consensus in the field has emerged (Corn & Heubner, 1998). Insistence on the primacy of Hatlen's expanded core curriculum is a critical component of that agenda.

As early as 1879, Congress recognized the importance of meeting the curricular needs of blind students when it passed the Act to Promote the Education of the Blind (Koestler, 1976). Today, this Act provides a line item for each state for the purchase of educational technology, media, and materials through the American Printing House for the Blind (APH). Depending on the number of blind students residing in any particular state, a quota account is established on an annual basis for supplementing the curricular needs of blind students. Under IDEA, the responsibility for meeting educational needs of blind students remains with states and school districts, so APH resources are not intended as comprehensive but rather as a supplement to the material needs of blind students. (Visiting APH's web site reveals directions for accessing an online database of products and links to resources keyed to Hatlen's (1996b) common core and expanded core curriculum areas.)

Over the past thirty years, comprehensive treatment of the challenge of educating students who are blind or visually impaired can be found in the comprehensive works edited by Lowenfeld (1973), Scholl (1986), and, most recently, Koenig and Holbrook (2000). More narrowly focused resources can be found in Chen (1999) for the essential elements of early intervention programming; in Ferrell (1985) for early childhood education; in Wormsley and D'Andrea (1997) for Braille literacy; in Wolffe and Sacks (2000) for social skills curriculum; in Levack (1994) for use of low vision; in Blasch, Wiener, and Welsh (1997) for orientation and mobility; in Corn (2000) for assistive technology; and in Wolffe (1999) for career education.

As a field, education of the blind and visually impaired recognizes the disproportionate numbers of students within its service population who are identified as multiply-disabled and deaf-blind. This is why Corn's (et al., 1995) description of the national agenda for educating visually impaired students includes those with multiple disabilities. While there are curriculum resources specifically identified for blind students with multiple disabilities (Sacks & Silberman, 1998), more generally applicable approaches for this population are described below (*see* Significant Developmental Delay).

Deaf/Hard-of-Hearing

Curriculum for the deaf has also developed within residential schools of the 19th and 20th centuries. Throughout this time period, controversy surrounded the development of a curriculum for the deaf. Debate centered around whether to maintain an emphasis on teaching sign language in the curriculum for deaf students or to follow an oral approach focused on lip-reading and listening skills as well as on how to speak. Today, this controversy continues at the language level—the core of human communication. On one side is the position that deafness is a difference and not a disability; Deafness is a culture with its own native language—American Sign Language (ASL). On the other side is the position that deafness is a disability, creating in an individual significant limitations in communicative competence; measures must be taken in order to compensate for these limitations. (For example, cochlear implants provide access to the stimulus for hearing speech sounds and establish conditions for learning to speak and to use amplification [hearing aids].)

Crucial curricular content for deaf students include language, reading, and writing; Deaf culture, speech development, and aural habilitation (Turnbull, et al., 2002). A curriculum in language often consists of teaching students English sentence patterns, starting with basic patterns and moving to increasingly complex structures. A curriculum in reading regularly involves using books with relatively simple grammatical structures or basal reading material that is designed so that sentence patterns increase in difficulty from book to book. A typical writing curriculum requires students to learn the rules of different types of discourse and the rules of grammar. Curriculum in language, reading, and writing today can be best described as a balance of analytical and holistic methods (Turnbull, et al., 2002).

Learning about Deaf culture is an important curricular goal for all students who are deaf or hard-of-hearing, regardless of educational setting. One goal of instruction about Deaf culture is to help students develop understanding of the culture of the Deaf community so that they can participate to whatever extent they wish. A second goal is to help transmit Deaf culture to the next generation of individuals who are deaf or hard-of-hearing.

Curriculum regarding speech development is aimed at helping children develop breath control, vocalization, voice patterns, and sound production. This curriculum focuses both on producing spoken language and on improving speech. Aural habilitation curriculum involves helping students use their remaining hearing effectively. Depending on a student's capability, learning goals might include awareness of sound, localization of sound, discrimination of sound differences, or recognition of sound. For some it may be recognition of speech used by others (Turnbull, et al., 2002).

Literature concerning academic/vocational content of curriculum for the deaf contains disappointingly few articles, reflecting an historical lack in the field. Pagliaro (1998a; 1998b) wrote about the impact of mathematics reform on the education of deaf students and documented the poor preparation of math teachers for instructing the deaf. LaSasso (1999) has reviewed the literature on problems with test-taking skills among deaf students and has stated that the teaching of test-taking skills should be part of students' programs. Furlonger (1998) has looked at career awareness of deaf and hearing adolescents in New Zealand and found significant differences in career measures and vocational maturity, in favor of hearing respondents. He proposed more attention to career awareness and vocational preparation.

In order to be effective, curriculum must be instituted early. Magnuson (2000) investigated the cognitive development of two deaf boys in Sweden enrolled in a sign-based preschool. One had been identified, and habilitation started, by four months of age, and the other had not been diagnosed until two years of age. Magnuson reported differences in social and linguistic development of the two boys in favor of the one who had been diagnosed at four months. She concluded that the boy who started at age two lacked early stimulation, resulting in poor language development.

Teaching Approaches

In deaf education, three distinct communication approaches are identified for teaching the deaf and hard-of-hearing. These approaches are the bilingual-bicultural approach, the auditory-oral approach, and the total communication approach.

Bilingual-Bicultural Approach

The position of the bilingual-bicultural approach is that ASL is the natural language of Deaf culture and that ASL should be the primary language choice for deaf students, with English considered a second language (Gargiulo 2003). When using this approach, the objective is to provide a foundation in the use of ASL, with its unique vocabulary and syntax rules, and, at the same time, to provide ESL instruction for English vocabulary and syntax rules. With this approach, ASL is the method of communication in the classroom.

Kemp (1998) has discussed the difficulty of learning ASL and the misperception that it may be learned easily. He argued that, like all complex and subtle languages, mastery beyond a basic level requires extensive exposure and practice, and he concluded that ASL should be approached with respect and with the understanding that mastery will occur only over time. On a similar note, Galvan (1999) has reported that there were differences in sign complexity by three to nine years of age between native signing deaf children of deaf parents and early signing (before five years of age) deaf children of hearing parents.

Mason and Ewoldt (1996) have presented the position that a whole-language approach to literacy and bilingual-bicultural (bi-bi) education complement each other. Additionally, Andrews, Ferguson, Roberts, and Hodges (1997) have reported on a bi-bi program with seven deaf children of diverse racial and ethnic backgrounds in east-central Texas from 1993 to 1996. They found grade-level achievement at first grade, showing that language development was not delayed. Knoors and Renting (2000) have reported on the involvement in different tasks of six deaf children in the Netherlands using spoken Dutch and the Sign Language of the Netherlands (SLN). They found there was greater involvement during activities led by a deaf teacher using SLN.

Auditory-Oral Approach

The position of the auditory-oral approach is that students with hearing impairments can develop listening/receptive language and oral language expression skills. It emphasizes the use of residual hearing, amplification, and speech/language training. When using this approach, the

objective is to facilitate the development of oral (spoken) English. The method of communication used by a student would be oral (spoken) English (Gargiulo, 2003).

Research on teaching practices related to this method has thus far been inconclusive. It does appear, however, that hearing-impaired infants born to Deaf parents using ASL may exhibit significantly improved language development (Hunt & Marshall, 1999). Research conducted by Moores (1996) suggests that parents who use a total communication approach, including manual signs, fingerspelling, and spoken language with their child and with each other enhance their child's acquisition of language. It has also been shown to be important to switch from a child-centered to a family-centered approach. There is a great need for families to have access to comprehensive information about educational options for their children (Gargiulo, 2003). The debate between manualism or oralism continues to be a heavily charged issue.

Total Communication Approach

The position of the total communication approach is that simultaneous use of multiple communication techniques enhances an individual's ability to communicate, comprehend, and learn (Gargiulo, 2003). When using this approach, the basic objective is to provide a multifaceted approach to communication in order to facilitate whichever method works best for each individual. The method of communication used by a student should be a combination of sign language, fingerspelling, and speech-reading. Grushkin (1998) has argued that fingerspelling has been under-utilized and that educators should take advantage of its high potential for equivalence to English orthography.

Inclusion of Deaf and Hard-of-Hearing Children

There are many strategies for teaching students with hearing impairments. It is important to promote acceptance of these students, and to provide an environment where students feel accepted and where modifications can be made without causing undue attention to be focused on individual students. This can be aided by efforts to welcome a student to their new classroom, by discussing the student's hearing loss with him/her and letting him/her know his/her teacher is willing to help, by having the student or another person—with the student's approval—explain about the student's hearing loss to the entire class if appropriate, by making modifications seem

as natural as possible so that the student is not singled out, by accepting the student as an individual and being aware of his/her assets and limitations, and by encouraging the student's special abilities or interests. Adapted from Turnbull (et al., 2002), several factors that appear to contribute to effective placement in general education settings are listed below:

- Classroom teachers need time to learn about their student and deafness. A student's team, usually including their general education teacher, consultant, interpreter, and speech language pathologist need time to share information and plan instruction.
- Professional staff and a student's parents must be committed to making placement successful and feel confident about a student's ability to be successful.
- School and district leadership must provide the kinds of support that promote positive outcomes, such as providing adequate professional staff, paraprofessional staff, computers, and an adequate budget for the purchasing of materials and equipment.
- Professional staff must provide information about the needs of students who are deaf/hard-of-hearing and must be engaged in activities that enable them to understand program design, clarify their roles and activities, and identify appropriate instructional strategies.
- Parents need to be involved on a daily basis and not relegated merely to IEP planning.
- Teachers of the deaf must have occasional opportunities to teach a whole class or to team teach with a general education teacher.
- A school must offer structured and supportive extracurricular activities.

Environmental Concerns

Another important suggestion for teachers of hearing impaired students is to provide them with preferential seating in their classroom. A hearing-impaired student should have a seat near where the teacher usually teaches. The student should be able to see the face of the teacher without straining. The student should be seated away from noise sources, including hallways, radiators, and pencil sharpeners. The student should sit where light is on the teacher's face and not in their eyes. If the student has a better ear, that ear should be turned toward the teacher. The student should also be allowed to move when necessary for demonstrations or other classroom activities.

Teachers should also increase visual information made available, since the student will use lip-reading and other visual information to supplement what he or she hears. The student will need to see the teacher's face in order to lip-read. The teacher should use visual aids whenever possible and should demonstrate what the student is supposed to understand whenever possible. A chalkboard should be used for assignments, new vocabulary words, and key phrases.

Other suggestions for classroom teachers are to minimize classroom noise, modify teaching procedures, and have realistic expectations of students. Teaching modifications allow a student to benefit from instruction and decreases the need for repetition. Teachers can aid these efforts by being sure a student is watching and listening when others are talking to him/her, by being sure a student understands what is being said and having him/her repeat information or answer questions, by rephrasing (rather than repeating) questions, by repeating or rephrasing things said by other students when appropriate, and by introducing new vocabulary to a student in advance prior to a lesson.

Adapted Educational Methods

Instructional interventions for students with hearing impairments include adapted methods of communication as well as the use of audiologists and interpreters (Gargiulo, 2003). Different instructional interventions may be required depending on the severity of hearing loss. These include hearing aids, personal FM systems, favorable seating, medical management, auditory skill-building, help with self-esteem, sound-field FM systems in the classroom, and/or special educational support.

There are four basic types of hearing aids available: 1) in-the-ear aids, 2) behind-the-ear aids, 3) body aids, and 4) bone-conduction aids. Assistive listening devices (ALDs) can also be used to enhance participation and responsiveness of people with hearing loss. In addition, students sometimes use auditory trainers—specifically, FM systems—in their educational settings. These amplification systems are easy to use, enhance signal-to-noise ratio, and are often more effective than hearing aids in managing acoustical problems inherent in many classrooms.

(With sound-field systems, the teacher wears a small microphone, and his or her voice is transmitted to various speakers placed around the room or on a desktop).

It is also important that teachers ensure that hearing aids and other amplification devices are used when recommended. Teachers should understand that most hearing aids make sounds louder but not necessarily clearer. Students' hearing devices should be checked daily to ensure that they are always in proper working order. Students should be encouraged to and trained to care for their own hearing device.

Everyday alerting devices can be adapted to meet the needs of hard-of-hearing students. These include wristwatches, doorbells, flashing-light clocks, flashing lamps, pillow vibrators, and specially-designed smoke detectors. Captioning is available on many television programs to make entertainment more accessible to people with hearing impairments. In addition, a telecommunication device for the deaf (TDD) can be used by individuals with severe hearing impairments to help them communicate by telephone. (A TDD is a small keyboard with an electronic display screen and a modem attached.) Amplified telephones are also available in a wide range of models and capabilities.

Easterbrooks and Mordica have examined teachers' ratings of functional communication skills of deaf children with cochlear implants and concluded that a teacher's role in implant use warrants more attention and that all factors should be considered before advocating or choosing this "financially, emotionally, and therapeutically challenging option" (Easterbrooks & Mordica, 2000).

Using Technology

Computers have many possible applications for students with hearing impairments. Special programs offer the opportunity for students to learn at their own comfort level and pace, and special programs are available for speech drill, auditory training, speech-reading, sign language instruction, and supplemental reading and language instruction. Web sites related to hearing impairment include: the Alexander Graham Bell Association for the Deaf and Hard of Hearing (http://agbell.org), The Laurent Clerc National Deaf Education Center

(http://clerccenter.gallaudet.edu), The American Speech-Language-Hearing Association (http://www.asha.org), and Self-Help for Hard of Hearing people (http://www.shhh.org).

There is a need to encourage reflection upon teacher practice and to promote increased application of computer technology in educational curricula. To achieve this goal, a greater understanding of the relationship between teacher variables and teacher adoption of computer use is needed (Marcinkiewicz, 1994). This information may be used to help teachers become familiar with how computers work in the classroom and how they can be used for instruction (Budoff, et al., 1984; Min, 1992).

For technology to work in schools, it is critical that teachers support the concept of instruction with computers and use them constructively with students. Stubbs (1990) found that in enhancing teacher technology training programs, the three primary means of support are equipment budget, access to equipment, and support personnel. Congress has suggested that teachers need more than just access to resources of hardware and software. They also need "opportunities to discover what the technologies can do, [to] learn how to operate them, and [to] experiment with ways to best apply them in the classrooms" (Rivard, 1995).

Deaf-Blind

Students who are deaf-blind present a unique challenge to families, schools, and communities. Despite their designation, they represent an extremely heterogeneous population. Given their relatively small size in number, as well as their diversity, curriculum and instructional arrangements must remain flexible. Varying amounts of remaining vision, residual hearing, cognitive capacity, psychosocial status, and motor integrity all contribute to a complex set of needs.

In an overview of deaf-blindness, Miles (2000) makes several important recommendations, which we discuss below.

Communication

The most important challenge for parents, caregivers, and teachers of students who are deaf-blind is meaningful communication, which can be thought of as a conversation; it uses body language, gestures, and both signed and spoken words. The conversation begins with taking notice of what the deaf-blind child is paying attention to and communicating a shared interest. Unlike sighted or hearing children, who might respond to gestures, facial expressions, or sounds, children who are deaf-blind will often need touch to communicate shared interest. Pausing after each interaction allows time for the deaf-blind student to respond. Successful interaction depends on respecting the child's timing, which may be slow. These back and forth interactions with their pauses are the conversations which become the basis for language learning. Symbolic communication is the next step. Simple gestures or objects can accompany the introduction of words. These gestures or objects serve as symbols or representations for activities, teaching the child that one thing can stand for another, and also helping the child to learn to anticipate events.

An additional challenge is providing an environment rich in language that is meaningful and accessible. Such an environment can be created through the use of whichever symbol system is most accessible to the child.

Principal communication systems for persons who are deaf-blind are these: ASL, Braille writing and reading, fingerspelling, gestures, large-print writing and reading, lip-reading of speech, object symbols, picture symbols, Pidgin signed English, sign language, signed English, Tadoma method of speech-reading, touch cues. A reliable and meaningful routine that can be communicated to a deaf-blind student is also important. Touch cues, gestures, and use of object symbols are some typical ways in which to let a child who is deaf-blind know what is about to happen to him or her. An anticipated routine can help to decrease the anxiety associated with a deficit of sensory information.

Orientation and Mobility

A deaf-blind child will need help learning to move about in his or her environment. Attention must be paid to the immediate physical space surrounding a child so that the physical space rewards movement with stimulation to encourage further movement. Orientation and

mobility specialists, as well as physical and occupational therapists, teachers of the visually impaired, and health professionals, can be helpful.

Individualized Education

Education for a deaf-blind student must be highly individualized. Assessment is critical both for estimating underlying intellectual capacity and for creating appropriate educational programs. To discourage isolation, it is important to involve people who are familiar with both blindness and deafness. These services should be obtained as early as possible to ensure maximum opportunities for learning and meaningful contact.

Transition

Near the end of a school-based education of a deaf-blind student, transition and rehabilitation services will be necessary to find appropriate work and living arrangements. Teamwork will be required "among specialists and agencies concerned with such things as housing, vocational and rehabilitation needs, deafness, blindness, orientation and mobility, medical needs, and mental health" (Miles, 2000). Central to such a transition process, of course, is the deaf-blind person and his or her interests and needs.

Inclusion in Family

A major challenge is the inclusion of a deaf-blind child in the flow of family and community life. Parents must learn to identify subtle rewards, such as hand or body movements, instead of typical responses to care such as smiles. Parental perceptions and expectations of developmental milestones and successes may also need to be altered.

Teaching Strategies and Content Modifications

People who are deaf-blind who have high-quality lives have several things in common: they accept themselves as individuals with unique experiences and gifts, their educational experiences have maximized their ability to communicate and function in a typical environment, and they live and work in accepting families and communities.

Recommended teaching strategies and content modifications for a student with deaf-blindness are offered by Moss and Hagood (1995). The authors begin by asserting that students with deaf-blindness have unique educational needs. Without sight or hearing, he or she relies on doing in order to learn. Small-group or individual instruction becomes critical, as large-group instruction might only be useful during activities in which a student is consistently active (such as playground activities). New experiences may be difficult for a deaf-blind student. As trust is essential, bonding between student and instructor is critical. It is important to create balanced interaction by taking turns, to encourage a student to be responsive; directive instruction is therefore less valuable. Safety is also of high importance, both in the environment and in creating a feeling of safety in which to move around independently. An orientation and mobility specialist can help develop safe routes for travel and to identify obstacles in an environment.

A student with deaf-blindness should have a curriculum focused on bonding and developing interactions and routines for expanding the frequency and functions of communication. This student needs instruction to piece together inputs, and he or she must be taught both to accept and use such instruction. An additional priority should be to develop a communication foundation for learning. A student might first have to be taken step-by-step through new activities to learn what will be expected of him or her. After he or she understands what is expected, this support should be removed to allow the development of independence. Learning should be functional, and clear goals and objectives must be developed for a deaf-blind student. Objectives should be limited in number, as it will take much practice before a student can generalize what he or she has learned to other situations. Vocabulary concepts should be broad, and consideration of the extent to which they can be generalized is important. A deaf-blind student needs a great deal of support. This support can at first be provided by teaching staff, but can later be modeled for other students in class for use during play or other learning situations. Specialized training and support may be needed for teachers without knowledge or experience in the specific area of deaf-blindness.

Significant Developmental Delay

Students with significant developmental delay represent a special population for whom expectations are generally low. However, like all people, these students have many unique

strengths and specific talents in certain areas. It is important to see beyond disability and come to know and appreciate each individual. It is a daunting challenge for educators to ensure these students have access to the general curriculum.

The field of educating students with severe disabilities has undergone change in some key curricular trends. In the 1970s, as programs were first created for individuals with severe disabilities, educators sometimes borrowed ideas from early childhood curriculum. By the late 1970s, Brown (et al., 1976) had challenged the field to focus instead on functional, age-appropriate skills. In the 1980s, many educators began to rely on emerging behavioral methods to teach students the skills believed to be prerequisites to community placements. Skills including food preparation, housekeeping and laundry, home safety and first aid, telephone use, dining out and buying snacks, shopping, community mobility, and community leisure were all taught by a variety of systematic instructional procedures. As more opportunities for school inclusion emerged in the late 1980s and 1990s, professionals often focused on *social* inclusion. Inclusive education provided a means for students to cultivate a circle of friends (Ryndak & Alper, 2003). Today, focus has shifted to *instructional inclusion*. As Ford, Davern, and Schnorr (2001) note, the current mandate for assessment and accountability for students with significant cognitive disabilities will influence curriculum decisions for years to come. Most states' standards focus on what Vanderwood, Ysseldyke, and Thurlow (1993) have described as academic and functional literacy outcomes. In contrast, many IEPs for students with severe disabilities focus on functional and social skills reflective of the more recent curriculum trends for this population. When states first began working on alternate assessments, many focused on functional outcomes with no link to actual state standards (Thompson & Thurlow, 2001). Almost every state alternate assessments examine the same standards as general assessments either by expanding state standards, linking standards to a set of functional skills, or assessing standards plus an additional set of functional skills (Thompson & Thurlow, 2001). Thus, most states as of 2001 view access to the general curriculum and participation in alternate assessment as related requirements. As a result, alternate assessment is creating a new era of curriculum for these students with much stronger emphasis on skills such as literacy and numeracy than in the past.

Curriculum

Planning curriculum starts with the individual needs of a student rather than a disability label or the availability of a separate program that typically serves a particular type of student. After a student has been identified as having a disability, it is then possible to link student-specific goals and outcomes to general education curriculum standards. Planning should focus on an individual's capacities and assets. Family members and friends should be involved in planning. A collaborative team should analyze the general education curriculum and routines to identify when and how the learning needs of a student, expressed in terms of foundational skills, can be addressed within the context of the general education classroom.

The following assumptions, based on *Choosing Options and Accommodations for Children* (COACH) (Giangreco, et al., 1998), are inspiring in developing curriculum for students who are significantly developmentally delayed:

- Design of curriculum should be related to life outcomes that are valued
- Families should be considered consumers and partners in the design of curriculum
- Collaboration is essential in the design and delivery of quality education
- Curriculum objectives should be developed based on priorities and outcomes valued by a student and his or her family rather than professionals representing different disciplines
- Problem-solving strategies are instrumental in the design of effective curriculum and should be appropriately included

At each grade level, all students are expected to demonstrate proficiency in core curriculum areas as measured by each state's assessment system. It may be appropriate and feasible for a student with severe cognitive disabilities to demonstrate competence on all, part, or none of the core curriculum content for a given grade level (or unit addressed for a given grade level). When the needs of students are expressed in terms of critical or foundational skills, well-established strategies are available to identify opportunities for these skills to be addressed within the context of the general education curriculum. The five areas described below represent domains of a functional curriculum from which instructional targets can be selected and blended

with the general curriculum. Browder (2001) and Ryndak and Alper (2003) provide extensive treatments of these curriculum areas.

1. Functional reading

Functional reading involves being able to recognize specific sight words and to use them in the performance of daily routines. Most reading instruction targets the outcome of literacy; that is, students are expected to be able to read whatever printed material they may encounter.

2. Functional math

Functional math refers to basic math skills needed to perform skills of daily living. It includes money management, time management, measurement, counting, and simple computation. In a typical general education curriculum, students learn number and computation skills needed to perform these tasks by the end of second grade. Individuals with significant cognitive disabilities often have not mastered basic math skills needed in daily living activities by this age, and will need to learn these concurrently with their applications to time and money management.

3. Community and leisure skills

With the appropriate support, all students can participate actively in their communities. The purpose of teaching community and leisure skills is not to "ready" students to be part of their communities but to help them benefit from these experiences more fully. Community and leisure skills are included in nearly all life-skills curricula. An important way that schools can prepare students for both current and future community and leisure opportunities is to directly involve them in these activities through community-based instruction.

4. Home and personal living skills

Nearly all published curricula for students with severe disabilities include home and personal living skills. A large body of research now exists regarding how to teach skills such as eating, dressing, using the toilet, brushing the teeth, housekeeping, food preparation, and laundry skills (Konarski & Diorio, 1985; Westling & Fox, 1995).

5. Communication and social skills

Communication skills are often among the top priorities for students with significant cognitive disabilities. To be able to communicate with peers facilitates social interactions in inclusive settings. Many instructional interactions rely on communicative responses. Self-determination is also promoted through self-expression.

Three major components of communication are form, content, and function. When the form of communication is speech, teachers focus on syntax, including such skills as sentence structure, grammar, and inflection. When the form is an augmentative or alternative communication system (a non-speech system), teachers focus on teaching students to use that system effectively. Content of communication includes vocabulary and topics discussed. Function of communication relates to the purpose of communication.

Instructional Adaptations

Special educators must be focused on developing programs of high-quality instruction for students with significant cognitive disabilities that are anchored to the general education curriculum. These students continue to exceed our expectations if they have access to appropriate curricula and are taught using effective instructional practices.

Curriculum and instructional practices include basic skills and functional life-skills content designed to help students learn the work, domestic, or leisure skills needed for independent living: self-care skills, social interaction, recreation and leisure skills, job training, and community-based instruction (Drew, Logan, & Hardman, 1992; Morgan, Moore, M^{c}Sweyn, & Salzberg, 1992; Patton, Beirne-Smith, & Payne, 1990). School adjustment skills such as interaction with peers, working in groups, participating, communicating, complying with schedules and requests, improving general work habits (following directions, working with others, accepting supervision, meeting demands for quality work, demonstrating occupational safety skills, recognizing the importance of attendance and punctuality, working at a satisfactory rate) are also critical (Lewis & Doorlag, 1999). Additionally, attention skills, memory skills, functional academics (using money, carrying on conversations, learning survival words), choice making, learning strategies, time management, organizational skills, generalization skills, self

advocacy, community-based instruction, self-direction, health and safety, functional academics, should also be included in the curriculum (Sands, et al., 2000; Turnbull, et al., 2002).

Fisher and Frey (2001) have described ways in which students with significant cognitive disabilities have accessed the core curriculum in the past and have identified the services and supports necessary for participation in general education classrooms. In their work they describe the experiences of three students with significant disabilities (one elementary student, one middle school student, and one high school student) who had been members of general education classrooms in urban schools for at least three years. In their observations of these students, four themes emerged: (a) individualized, content-specific accommodations and modifications; (b) collaboration among members of a student's teaching team; (c) involvement of peers; and (d) disconnection between the students' IEPs and curriculum and instruction. Practical implications of Fisher and Frey's research are that students with significant cognitive disabilities should receive their special education services within general education classrooms. Thus, one implication of Fisher and Frey's work is that students must be included in general education classrooms in order to access these types of curricula and curriculum supports.

To succeed in general education classrooms, students with significant cognitive disabilities must also have access to personal supports and technology supports (Fisher, Frey, & Sax, 1999). Schools that want to implement inclusive schooling practices would be well advised to ensure that general and special education teachers have access to planning time if they expect innovations in curriculum to take hold.

Researchers investigating instructional adaptation have identified a variety of strategies for facilitating the inclusive education of students with severe disabilities. For example, incorporating choice, by allowing students to choose a Language Arts assignment, revealed dramatically decreased levels in undesirable behavior (disruptive and off-task) (Powell & Nelson, 1997). Furthermore, allowing students to choose the order in which they complete academic tasks has been shown to result in increased levels of desirable classroom behavior (Dunlap, et al., 1994). Priming, or pre-practice, has also been documented as an effective classroom intervention for students with significant cognitive disabilities. Priming consists of

previewing information or activities that a student is likely to have difficulties with before they actually engage in that activity (Wilde, Koegel, & Koegel, 1992). Priming has been shown to be effective in reducing disruptive behavior in students with autism and in increasing on-task behavior during class storybook reading activities (Wilde, et al., 1992) and in increasing initiations of social interaction with typical peers (Zanolli, Daggett, & Adams, 1996). Partial participation (Baumgart, et al., 1982) is another strategy for adjusting curriculum to facilitate the educational inclusion of students with severe disabilities . Partial participation, also known as multi-level instruction (Falvey, Givner, & Kimm, 1996), consists of allowing a student with a disability to participate in the same projects and instructional activities as the rest of their class, with specific modifications to the activity so that it suits a student's specific abilities and needs (Baumgart, et al., 1982; Falvey, et al., 1996).

Teachers have been taught to successfully implement instructional adaptations found to be effective for students with disabilities, including giving clear directions; appropriate, immediate feedback; and mnemonic recall strategies (Bulgren, Deshler, & Schumaker, 1997; Rademacher, Schumaker, & Deshler, 1996). General educators have been taught to effectively implement instructional adaptations in mathematics (Woodward & Baxter, 1997) and reading and writing (Vaughn, Hughes, Schumm, & Klingner, 1998).

Self-management

Teaching a student self-management in the classroom allows that student to function independently without relying on a teacher or a one-on-one aid (Koegel, Harrower, & Koegel, 1999). Self-management allows individuals with disabilities to become actively involved in the intervention process as well as more involved in their classroom environments. This increased involvement has the potential to improve autonomy by reducing dependence on adult intervention, which in turn provides a student with more opportunities to interact with classmates without the stigma of a one-on-one aid. Self-management has been suggested as an ideal intervention for students with significant cognitive disabilities to enable them to participate in full inclusion classroom settings (Reid, 1996).

Cooperative learning

A number of studies have demonstrated that teaching social skills to students with severe disabilities and their non-disabled peers in cooperative groups in integrated settings results in increased frequency, duration, and quality of social interactions (Kamps, et al., 1992; Kohler, et al., 1995).

Peer tutoring

Peer tutoring consists of any instructional strategy where two students work together on an academic activity, with one student providing assistance, instruction, and feedback to the other (DuPaul & Eckert, 1998). Peer tutoring strategies and their variants have been demonstrated to be effective in producing improvements in on-task behavior and math performance (DuPaul & Henningson, 1993) and in on-task behavior and social interactions (Locke & Fuchs, 1995).

Friendships

Inclusive classrooms are an excellent setting in which to evaluate and design interventions to promote friendships for students with disabilities; at the least, they provide these students with the opportunity to interact socially (Hurley-Geffner, 1995; Meyer, et al., 1998).

Educational Strategies

Horner, Flannery, and Snell's work (1996) on intellectual disabilities addresses the broad structure for educational strategies that meets the needs of students with severe intellectual disabilities. They recognize that special education is in a critical period for assessing educational strategies used with students with severe disabilities. For several years, these students have been at the door of the regular school and regular classroom. They are now part of the school reform movement. Horner and his colleagues have foreshadowed the real challenge of educational reform as defining systems that produce valued instructional gains while supporting the social inclusion that had become a key value in the education of these students. How to educate students with severe disabilities in the general education classroom without overburdening the general educator, or disrupting the education of students without disabilities, remains the question of the day. To achieve that goal (a) new strategies are needed for general educators, and

(b) the strategies for educating students with severe disabilities must be expanded and integrated with those available to regular educators.

Teachers of students with severe disabilities come to this task with a strong foundation in instructional systems and curriculum options grounded in direct instruction, systematic instructional delivery and data-based outcome measures. Good strategies exist for designing functional curricula that are sequenced to promote rapid, generalized acquisition. What continues to be less available are clear strategies and strategies for organizing broader variables related to quality education. The strategies we need today are strategies for how students should be grouped, how school-wide systems should be set up, and how funding should be used to achieve broader educational goals of all students (including those with the most severe disabilities) (Horner, Flannery, & Snell, 1996).

Significant Physical and Multiple Disabilities

Curricula most important to students with significant physical disabilities include skills that increase their personal independence, mobility within classroom, school, home, workplace, and community environments, and self-care skills. Self-advocacy varies according to a student's individual strengths and needs. "Goals ultimately include enhancing functional mobility, increasing communication, and enhancing capabilities in attending to daily living skills" (Geyer, et al., 1998), and enhancing self-determination in achieving quality of life. Essentially, special instruction in mobility skills, daily living skills, occupational skills, and, in severe cases, functionality in the everyday environment, are the critical needs of this population (Hanson, 1996; Heller, Alberto, Forney, & Schwartzman, 1996).

With high absence rates, modifications need to be made so that students can keep up with their peers (i.e., with the use of videotapes, telephone communications, schoolmates as tutors) (Culatta & Tompkins, 1999). Service from an interdisciplinary team of professionals that collaborate is ideal (Heward, 1996) although Hunt and Goetz (1997) argue for a transdisciplinary model—the same one or two professionals delivering all services to ensure continuity (Orelove & Sobsey, 1991: as cited in Hunt & Goetz, 1997). Collaboration efforts of professionals, families, and students working together as a community to deliver services, the use of assistive

technology (AT) to enhance a student's capabilities, and adapting the general curriculum are all highly recommended (Bryant & Seay, 1998; Smith, 1998: as cited in Turnbull, et al., 2002).

Other considerations for students with physical disabilities include applying principles of proper and customized positioning and seating; making classroom materials and work areas accessible, modifying the height, slant, or angle of work areas to meet individual students' needs; stabilizing work materials as needed, and using technology and adaptive equipment (mobility aids, hand controls, arm/wrist supports, page-turning devices, modified keyboards, scanners, voice-recognition programs, mouth-operated devices, etc.) (Sands, et al., 2000).

Education of classmates to help them understand their peers' disabilities and encouraging students with health impairments to discuss their needs and the characteristics of their condition with peers to lessen anxiety for all are also important practices (Wood & Lazzari, 1997).

Autistic Spectrum

The Diagnostic and Statistical Manual of Mental Disorders (fourth edition) (DSM-IV) (American Psychiatric Association, 1994) defines autism as a disability "…characterized by severe and pervasive impairment in several areas of development: reciprocal social interaction skills, communication skills, or the presence of stereotyped behavior, interests, and activities." Individuals with this disability have considerable difficulty in interacting with others socially and in communicating verbally. They also often engage in self-stimulating behavior and can have a very limited number of routines and interests.

"Effective intervention in autism appears to require early and intensive educational support that addresses the behavioral, social, and communication deficits associated with that disorder" (Rapin, 1997). Curriculum created for the autistic population includes a behavioral component, which focuses on decreasing self-injurious and or/self-stimulatory behavior (Simeonnson, Olley, & Rosenthal, 1987) as well as a functional element with language skills (Biklen, 1990). Other tasks recommended to be introduced include attention skills, memory skills, functional academics (using money, carrying on conversations, learning survival words), communication skills, social interaction skills, learning strategies, time management,

organizational skills, generalization skills, and self advocacy (Horner & Carr, 1997; Horner, et al., 2000; Sugai, et al., 2000: as cited in Sands, Kozleski, & French, 2000). Some programs also have curricula that include teaching an autistic person skills to help them cope with and appropriately control external environmental stimuli.

Some common practices of teachers of autistic children include having clearly defined behavioral expectations, frequently acknowledging appropriate behaviors, evaluating programs and making adaptations on an ongoing basis through a team approach, and targeting support to address students who need intense skill development and practice (Turnbull, et al., 2002). These teaching practices can be applied to all areas of an autistic person's skill development: behavioral, communicational, and functional. However, there are certain teaching practices that specifically relate to each type of skill listed above.

A teacher may help improve an autistic individual's behavior by formally assessing conditions that bring about inappropriate behaviors. Understanding the origin of problematic behaviors enables a teacher to then help an autistic individual learn new skills that will help him/her to achieve a desired result (e.g., receiving attention or obtaining a break). Teachers should also give positive consequences for using a new skill and occasionally use negative consequences for inappropriate behavior (Wood & Lazarri, 1997). Teachers can provide a variety of structured opportunities in which their students may practice skills so they can transfer their knowledge to different settings (Sigafoos, Kerr, Roberts, & Couzens, 1994). Some popular teaching practices for conveying functional skills include the following: "embedding opportunities to practice functional life skills in daily activities in the natural setting where they would occur; using concrete, age-appropriate, real-life teaching materials; demonstrating new routines in a sequential manner, checking for understanding at each step; and using a variety of modes for expressive and receptive communication skills" (Sands, Kolzeski, & French 2000).

Sands, Kolzeski, and French (2000) have identified various curricula and teaching practices that are currently in use for children with autism. Their educational interventions include sensory-motor therapy, communication therapy, social skills training, applied behavior analysis, and multi-treatment programs.

Sensory-Motor Therapy

Sensory-motor therapy curriculum is based on the idea that an autistic person has difficulty discerning and reacting to environmental stimuli because damaged sensory and motor pathways causes him/her to be either over-aroused or under-aroused. This over- or under-stimulation can cause an autistic individual to feel pain or discomfort. The need to engage in repetitive/ritualistic behavior is believed to be caused by an autistic person's need to control the amount of stimulation entering his or her nervous system. The purpose of sensory-motor therapy curriculum is to teach autistic students how to perceive environmental stimuli through alternative pathways in order to help them become desensitized to environmental stimulation. Ultimately, this should foster the maturation of his/her nervous system and result in an increased ability to learn social and communication skills. According to Dempsey and Foreman (2001), sensory-motor therapy includes the following components:

- *Sensory Integration Training* In this type of therapy, an occupational therapist performs activities to stimulate a child's skin to reduce sensitivity to outside stimulation. These activities can include massage, brushing or stroking the body of an autistic person in specific areas such as the joints, and having the autistic person walk on a balance beam or jump on a trampoline. Sensory integration training is believed to help "improve the sensory processing capabilities of the brain" resulting in increased vocalization, "eye contact, learning, and motor skills."

- *Auditory Integration Training* This type of therapy is based on the belief that autistic people have hypersensitive hearing, and that this is what causes a great deal of their learning and behavioral problems (Berard, 1993). In auditory integration training, an "audiogram is completed to determine the frequencies at which the individual's hearing appears to be too sensitive. Training then occurs for approximately 10 hours over a two-week period, in which a person listens, through headphones, to music in which the identified frequencies are altered out."

- *Music Therapy* Music therapy uses music to help an autistic individual either through

listening or playing an instrument him- or herself to work through his/her linguistic, emotional, learning, and motor skills difficulties.

Communication Therapy

According to language therapists, an autistic child may share the same interest and capability as non-autistic children to learn how to communicate with others and express him- or herself. Therefore, the curriculum of communication therapies focuses on learning language skills. Using a systematized approach emphasizing positive reinforcement, teachers using applied behavior analysis have succeeded in teaching autistic individuals how to speak or to use sign language or pictures to communicate (Carr, Pridal, & Dores, 1984).

Social Skills Training

Sometimes the world can appear to be a cruel place to a person who has autism. Because of their lack of social skills, an autistic individual may frequently take offense at innocent remarks and often appears awkward in social gatherings. Thus, the curriculum of social skills training focuses on teaching students how to act appropriately and how to function in society. Skills included in this curriculum are understanding social cues, reading body language, participating in conversations, looking at situations from other people's points of view, and communicating emotions. Social skills training may include role playing activities and the use of social stories (Sands, et al., 2000):

- *Role Playing* In role playing, an autistic student is presented with a social situation that he/she might encounter in daily life. (For example, greeting another person.) The student then acts out what he or she should do in the scenario. Sometimes a student might be videotaped during role play. After acting out the scene and possibly viewing it on video, the student's teacher provides feedback about the student's performance and may engage the student in conversation about what was done correctly or what could be done better next time.

- *Social Stories* The social stories methodology was created to teach people how to read social cues. In order to do this, a teacher will show an autistic individual a picture of a

social situation that might take place in daily life. Easy-to-read captions accompany each of the pictures. These captions explain how each of the illustrated individuals might be feeling according to their body language, and how to act appropriately when they see the same body language in others.

Applied Behavior Analysis

Applied behavior analysis is based on the notion that the neurological system of people with autism has not formed connections that allow learning and socialization to take place as it does for most people. It can be considered more of a teaching technique than a curriculum. It focuses on teaching cognitive, communication, and social skills in a highly structured fashion. Skills are broken down into small steps and taught using "a specific cue or instruction, and by using prompts" (Dempsey & Foreman, 2001). Appropriate responses are rewarded, and inappropriate actions are ignored (not reinforced). This specific teaching practice is based on applied behavior analysis. Learning goals for a student are determined by an individual analysis of the student's needs in terms of academic skills, life skills, and social skills. These are taught within a highly structured environment that is made consistent and predictable for a student.

Multi-Treatment Programs

Multi-treatment programs utilize an assortment of curriculums and teaching techniques to serve the needs of autistic students (Sands, et al., 2000). For example, Project TEACCH (Treatment and Education of Autistic and related Communication handicapped Children) uses a variety of behavioral teaching practices to help students learn how to care for themselves and conduct themselves suitably. Much of their curriculum is taught in a highly structured learning environment. Another program, called Giant Steps, integrates techniques used in sensory-motor training and applied behavior analysis. In addition to providing an education in a self-contained classroom, Giant Steps allows opportunities for autistic students to be mainstreamed in public schools. Treatment of an autistic individual is a daunting task. His/her neurological condition does not allow him/her to process information in ways that most people do. In addition, each child with autism does not respond the same way to any given treatment. What might be successful for some might not produce the same results for others. Thus, although the skills

spelled out in the curricula explained above should be acquired by those with autism, teaching practices used will have to cater to individuals.

VI. What planning models are in use for students with low-incidence disabilities?

The Evolution of the Individualized Educational Plan (IEP)

Access, participation, and progress in the general education curriculum depend on the development and implementation of high-quality Individualized Educational Plans (IEPs). The IEP is a document that makes explicit the components of a particular student's educational program by specifying that student's services, supports, ancillary aids, instructional accommodations, and, where necessary, curricular modifications. James J. Gallagher is generally credited with the concept of an IEP. He envisioned a renewable contract between parents and teachers of students with disabilities (Turnbull, et al., 2002). Gallagher was concerned that students with mild retardation were irretrievably stuck in special classes without clear and explicit goals and objectives toward which their programs should be focused. In 1972, he proposed two-year, renewable contracts to be negotiated through an administrative hearing process (Turnbull, et al., 2002). Only three years later, the IEP became the central component—indeed, the touchstone—of the Education for All: The Handicapped Children's Act of 1975. In a single document, student status information, program goals and objectives, resources and procedures for evaluation, and reporting of progress were all brought together by a multidisciplinary team of parents and qualified professionals to make an explicit, individualized educational plan. Originally, the formulation of a plan began with an examination of each child's developmental status (child study) and the analysis of their disability-related needs. Today, an IEP begins with an analysis of a student's present level of educational performance (PLEP) in the general curriculum (M^{c}Laughlin, 1999; Nolet & M^{c}Laughlin, 2000; Pugach, 2001).

Over the years, a number of changes have taken place in the manner in which IEPs are developed. Early on, assessment was viewed as a process distinct from instruction or intervention. It was done primarily for the purpose of diagnosis. A resulting diagnosis would lead to a three-year plan, subject to annual review, detailing the delivery of special education and related services to a student. Unfortunately, separate funding streams and distinctive professional

licensure erected an impenetrable wall between the providers of special and of general education, restricting the scope and focus of an IEP to special education services alone, and thus leaving general education almost entirely out of the picture. Over time, as the limitations of this compartmentalized approach to the IEP became apparent, matters gradually improved. Approaches to assessment became holistic, contextualized, and embedded in instruction. Interaction among team members became more dynamic as the power of collaboration was unlocked. Eventually, through a readjusted focus of looking at the whole student in natural settings and delivering services in inclusive classrooms, the process of constructing an IEP evolved from a once sterile and isolating undertaking to one that aimed to place a student into environments where acquired skills could be generalized and maintained.

Greater recognition of the importance of family and caregivers as active participants in a student's education helped to transform the process through which an IEP is formulated and carried out. Once merely passive participants, parents are now viewed as active coordinators or managers of services for their children. The introduction of early intervention and early childhood special education services in 1986, and transition to adulthood services in 1990, emphasized the necessity of taking a more long-term and far-reaching approach to providing for the educational needs of students with disabilities—one that looked at a student's educational progress from infancy to (ideally) independent adulthood. Successful implementation of this approach requires planning with family, community, and adult service agencies. Families thus became more empowered as active decision-makers, looking ahead and looking outside to find necessary services and supports to achieve high quality of life and community integration for their children with disabilities. Today's challenge to IEP teams is to find ways of blending specialized curriculum with the offerings of general education curriculum.

What enabled special education services to move out of and away from substantially separate settings into family systems, neighborhoods, communities, workplaces, and inclusive schools? Certainly, consumer demand, litigation, and legislation had much to do with transforming special education from a "place" to a system of supports and resources. However, models for implementing and advancing this transformation had to be developed and refined through reflective practice. Formal arrangements of service delivery options in special education,

independent living, and supported employment often leave out the potential benefits of informal or natural sources of support potentially available in family and community networks. To overcome these shortcomings, person-centered approaches to planning focus on the whole individual over time in the context of family, family surrogates, and community. Some students with low-incidence disabilities have difficulty feeling connected to, and finding affiliation with, other members of their community. Below are a series of approaches to team planning that have spearheaded the movement toward increased communitization and inclusion for students and their families. Many of these approaches are known collectively as person-centered planning (Mount, 1992).

Person-Centered Planning

The idea of "person-centered planning" emerged as an alternative to the static, traditional "systems-centered" approaches to special education, which has in the past concentrated merely on the placement of individuals into available "slots" in the special education system, the rehabilitation service system, or the adult services system (Mount, 1992). Most notable among the person-centered planning approaches are Making Action Plans or MAPs (Forest & Lusthaus, 1990) and Group Action Planning or GAP (Turnbull & Turnbull, 1992; 2002). Planning Alternative Tomorrows with Hope or PATH (Pearpoint, O'Brien, & Forest, 1993) and Circle of Friends (Perske, 1988) are tools that can enhance the effectiveness and versatility of MAPs.

Group Action Planning (GAP)

GAP is a person-centered planning process developed by University of Kansas researchers at the Beach Center (Turnbull & Turnbull, 2002). GAP provides the opportunity for an individual with a severe disability to be supported by a unified, reliable alliance that includes the individual (him- or herself), family members, friends and professionals. Turnbull and Turnbull summarize research demonstrating the critical importance and positive impact of "reliable allies" in person-centered planning. As with other person-centered approaches, GAP assists individuals and their families to envision best possible outcomes and helps bring their vision to a reality. GAP members make a commitment to accomplish, monitor, and adjust those

goals that provide continuous, ongoing support to individuals with a severe disability and their families.

The GAP process involves seven steps: (1) inviting people from an individual's natural network to help with the planning process; (2) choosing a facilitator who communicates well with others and is willing to assign tasks; (3) engaging an individual person and their family as much as possible; (4) highlighting information based on personal knowledge in contrast to professional "knowledge"; (5) fostering dynamic dreams for the future, directed and controlled by an individual with severe disabilities and their family; (6) brainstorming to arrive at solutions based on everyone's input that are driven by high expectations; and (7) unrelentingly celebrating progress made by the team.

Making Action Plans (MAPs)

MAPs, a widely used approach to person-centered planning, adheres to six central tenets (Pearpoint, Forest, & O'Brien, 1996):

1) All students belong in the regular classroom
2) General education teachers can teach all children
3) Necessary supports will be provided when needed
4) Quality education is a right, not a privilege
5) Outcomes must be success, literacy, and graduation for all
6) Creative alternatives will be made available for populations who do not succeed in typical ways

MAPs is a collaborative planning process that brings together key actors in a student's life. It involves a student and his or her peers, family, and teachers to aid in the identification of that student's goals and dreams and the educational and community resources for making them come to fruition. MAPs is comprised of seven essential elements:

1) graphic recording
2) hospitality

3) key professional people (attend and take part in discussion, as do a student's parent(s) or guardian(s))
4) a student, his or her siblings, and friends (attend and take part)
5) key issues (are addressed)
6) a next meeting (is scheduled)
7) a concrete plan of action (is developed)

MAPs has been used effectively for supporting students in the general education classroom. Two facilitators—the MAPs recorder and the process facilitator—are employed to move the process through MAPs' eight essential questions:

1) What is a MAP?
2) What is the story?
3) What is the dream?
4) What is the nightmare?
5) Who is the person?
6) What are his/her gifts, strengths, talents?
7) What are his/her needs?
8) What is the plan of action?

In concluding a MAP meeting, the process facilitator asks one final question: *Will you give me one word or phrase to sum up your experience of this MAP?*

MAPs is not intended to take the place of an IEP. It can be a powerful way of personalizing an IEP so that it sets in motion a process for fully including a student in his or her school or community. In this sense, it is not merely an "academic exercise" or a "neutral tool" but is rather both "talk and action" (Pearpoint, Forest, & O'Brien, 1996).

Planning Alternative Tomorrows with Hope (PATH)

PATH is an extension of the MAPs process. PATH makes use of important information gathered during a MAP session and, with it, develops a more definitive plan of action. PATH

addresses both long- and short-term planning. and is an eight-step process intended to provide a concrete path to guide the MAPs process. A parent, guardian or primary caregiver may serve as a *pathfinder*—a pathfinder wants "to explore ways to realize a socially important vision in a complex and dynamic environment" (Pearpoint, O'Brien, & Forest, 1993).

Before beginning PATH, the pathfinder addresses four questions:

1) Do we share a problem that we want to solve?
2) Do we share an important purpose, or do we want to find out whether we do?
3) Are we willing to face the possibility that, because important problems frequently call for shifting power arrangement and renegotiating roles and rules, we may have to confront significant conflicts, and we will certainly have to consider big changes in the way we do things?
4) Do we have the energy for the kind of learning that PATH demands?

PATH is a facilitated and social process with two guides—a process facilitator and a graphic recorder. It is important that guides have had the experience of being a pathfinder. Participation must be voluntary.

PATH's eight steps include the following:

- *Touching the Dream* (the "North Star"): A dream is the "expression of the pathfinder's identity and orientation" (Pearpoint, et al., 1993). Using probing questions, the facilitator tries to elicit a picture of what the pathfinder's dream is.

- *Sensing the Goal*: To find success, the pathfinder looks backward, pretends success has already been achieved, and describes what changes would have happened as a result. The pathfinder then goes forward and identifies a time-frame for change and dates by which meaningful results will have been achieved. The ideal time-frame is "just beyond your grasp" (Pearpoint, et al., 1993). The graphic recorder records all details.

- *Grounding in the Now*: The energy that emerges during the process is in the tension between the pathfinder's desires for the future and the realities of the present. The pathfinder is asked for an honest description of the present, and the graphic recorder records the details. The facilitator then summarizes and confirms.

- *Identifying People to Enroll*: Enrolling is "honoring a shared commitment." For each person identified, a pathfinder is asked to define what contributions this person can make to their dream; after a list is created, the pathfinder highlights those most likely to participate. The facilitator reviews and confirms.

- *Recognizing Ways to Build Strength*: The facilitator asks the pathfinder to identify strengths needed to realize their dream, the graphic recorder records these, and the facilitator summarizes and confirms.

- *Charting Action for the Next Few Months*: The facilitator asks the pathfinder to chart actions to transpire for the next three months. The facilitator then confirms that chosen actions match with the student's dream and summarizes the resulting action plan.

- *Planning the Next Month's Work*: The facilitator asks the pathfinder to plan for the next month, ensuring adequate planning time for each area of the student's action plan, and then summarizes and confirms.

- *Committing to the First Step*: The pathfinder sets a clear first step. The facilitator summarizes and confirms, ensuring that the first step is not taken alone.

Adapted from Pearpoint, O'Brien, & Forest, 1993

Circle of Friends

Circle of Friends (Perske, 1988) is an approach for accessing more natural or informal sources of support for students with low-incidence disabilities. If a student does not have a "natural" circle of friends, an educator can help facilitate a process of gathering people to be involved with and committed to this student. The process begins with a social scan, which is a

quick picture of people involved in a student's life. A student at the center begins by drawing four concentric circles:

1) First circle = Circle of intimacy: those most closely connected and important to the student
2) Second circle = Circle of friendship: good friends of the student
3) Third circle = Circle of participation: people, organizations, and networks with whom a student is involved
4) Fourth circle = Circle of exchange: people paid to provide services to a student

In a person-centered planning process, teams need to know the range of human resources that can be relied upon in order to work collaboratively in support of the whole-life needs of an individual with severe or significant cognitive disabilities. The Circle of Friends approach provides a useful process for teams to gather that information in an informal, family friendly manner.

Collaborative Planning and the General Curriculum

Giangreco, Cloninger, and Iverson (1998) have developed Choosing Options and Accommodations for Children (COACH). Refined through several iterations, COACH is an approach to collaborative planning that, in its latest version, considers access to the general curriculum. The person-centered approaches discussed thus far have emphasized social inclusion and networks that can be accessed to effect that inclusion. Wehmeyer and his colleagues, (et al., 2002) explain that COACH goes beyond person-centered planning to include *student-directed planning.* Rather than focusing on family and social networks of support, student-directed planning places an individual at the center of the planning process, thereby promoting self-determination, self-reliance, and independent decision-making. Like other models, COACH is intended to accompany and not to supplant the IEP planning process.

COACH outlines a planning process specifically designed to assist teams in identifying the content of IEPs for students with significant cognitive disabilities in general education

settings (Giangreco, 1996). The use of the COACH model in including students with severe disabilities in general education classrooms has been documented to change IEP goals by—

1. Making them more specific and reducing the overall number of goals written
2. Positively affecting relationships between families and professionals
3. Shifting control of educational decisions to parents
4. Facilitating changes in valued life outcomes as reflected in new program and social opportunities

COACH consists of two parts, labeled A and B. Part A assists with determining a student's educational program and creating an IEP, and Part B assists with the development of strategies and processes to implement the program created in Part A. The steps in Part A consist of the following:

1. A structure for conducting a family interview, the purpose of which is to determine family-selected learning priorities for the student
2. A structure for determining additional learning outcomes beyond family priorities
3. An elaboration of general supports that need to be provided to or for a student
4. A procedure to ensure that a family's priorities are reflected as IEP annual goals
5. A concise summary of the educational program devised, in the form of a "program-at-a-glance" document

At this point, a student's team determines the least restrictive educational placement for their student and the related services necessary to support that placement. Short-term objectives for achieving annual goals are developed and an IEP document is then finalized.

Part B addresses strategies for IEP implementation by first organizing and informing a student's instructional-planning team and then developing a schedule of activities that meets student needs during their participation in the general education classroom. Next, a structure is put in place in order to develop and implement instructional plans that address student needs and participation in class activities even when IEP goals differ from those of classmates. Finally,

COACH provides a framework for evaluating the impact of a student's educational experiences in terms of learning outcomes and valued life experiences.

After an overall plan for a student's education is developed by their IEP team, team members can determine educational program components using Part A. Following placement, determination of related services, and development of short-term objectives, information learned from the COACH process and from other sources is included on a student's official IEP. Part B of COACH is then used to refine current plans and to work on planning future educational goals.

COACH is designed for use with students between the ages of 3 and 21 with moderate, severe, or profound disabilities. Completion time varies depending on the experience of the chosen facilitator, how many family members are involved, and how many curriculum areas are reviewed. Any team member who is experienced with the COACH process can facilitate. Teams must agree on who takes the lead for various parts of the COACH process.

Different team members participate in different steps of COACH, as involvement of each team member depends on individual determination based on each step. No matter who participates, a team's facilitator is responsible for sharing results and feedback from meetings with the whole team. The only step that requires the attendance of particular team members is the Family Interview. "Family" refers to adults who live with and care for a student. This part of COACH is meant to be more intimate and to involve the team's facilitator, special educator, classroom teacher, and a students' parent(s) or guardian(s). Students can participate if their families so choose. COACH can be completed at any time and place that is convenient and agreed upon. However, as its intent is to develop an IEP, it should take place prior to a first IEP meeting date.

Planning in the Context of the General Curriculum

Educational program planning for students with severe or significant cognitive disabilities has moved progressively from a focus on meeting needs by teaching developmental skills in isolated settings to an emphasis on teaching functional or adaptive skills based on the results of ecological assessment. Accompanying this movement, the current approach to IEP

development has been transformed to focus on more long-term and community-referenced concerns for students, granting parents and other community members more responsibility and choice in decision-making and priority-setting. With the requirement that all students, regardless of severity of disability, must have access to the general curriculum, approaches to planning must now cross-index a student's goals and objectives on an IEP with their local school's curriculum.

Planning approaches must take into account the disability-related needs of a student, the priorities of a student and his or her parent(s) or guardian(s), their school's capacity to meet their needs, and entry points in the curriculum that will permit access. How disability-specific instructional targets can be embedded in general education components is addressed in following sections.

VII. How can IEPs ensure greater access to the general curriculum for students with low-incidence disabilities?

Expanding Roles and Functions of IEP Team Members

It should be well understood that students with low-incidence disabilities possess highly complex needs and are thus uniquely challenging to serve in local community schools. Required personnel, materials, and technological resources are all highly specialized and difficult to acquire and maintain, which exacerbates difficulties in supporting access for these students within the general education classroom. Much of the curriculum and many of the instructional practices which have evolved over time for these students were historically targeted to needs connected with disability. As interventions moved away from developmental skills to address more functional life skills, the context for assisting students with disabilities in improving their lives widened to include home, school, and community. Ecological assessment (assessing students in real-life contexts) and community-referenced curriculum helped to broaden this context by placing a high priority on the attainment of adult outcomes such as independent living, community participation, and employment. Due to these more open contexts, approaches to collaborative planning have emerged to meet the needs of students in the local school and community. This has also necessitated expanding the roles and functions of IEP team members.

For example, person-centered planning, has extended IEP team membership beyond previously prescribed roles limited to professionals. Person-centered planning includes extended family members and a 'circle of friends' to build upon more natural and informal sources of support in framing a vision of quality of life for an individual extending beyond the immediate present and into the future. Much of this movement into the community—as the natural ecology for persons with severe disabilities—was inspired by Lou Brown and his colleagues. They defined the *criterion of ultimate functioning* as "an ever changing, expanding, localized, and personalized cluster of factors that each person must possess in order to function as productively and independently as possible in socially, vocationally, and domestically integrated adult community environments" (Brown, Nietupski, & Hamre-Nietupski, 1976).

Democratic ideals and a specific value orientation has driven the stance on community integration and belonging taken by Lou Brown and many who followed. As the inclusion movement has progressed from mere physical inclusion to social inclusion and now to instructional inclusion, collaborative planning approaches that engage both general educators and special educators are called for. COACH, as described earlier, is an example of such an approach that can assist an IEP team in targeting priorities contained in the general curriculum for students with low-incidence disabilities.

No matter what approach to collaborative planning a school or district adopts, the IEP process must begin with an analysis of the student's present level of educational performance (PLEP) in the general curriculum. This is an approach that departs markedly from earlier perspectives on IEP development. The following discussion looks at how teams of special education and general education personnel can work together to develop and implement an IEP that ensures access, participation, and progress in the general curriculum for students with disabilities.

Origins of the IEP

The Individualized Educational Plan or Program (IEP) remains the touchstone of special education law. The IEP is a document that makes explicit the extent and intensity of special education and related services needed for a particular student with a disability. In 1972, James J. Gallagher proposed a contract between parents of students with mild/moderate mental retardation and the special education administration at the local level to agree upon goals and objectives that would structure programs to help students make effective progress. Gallagher's notion of a two-year, renewable contract was the predecessor of the current standard three-year IEP.

The structure and process of the IEP was also greatly influenced by the decision rendered in the landmark 1972 *PARC vs. Commonwealth of Pennsylvania* case. The Pennsylvania Association for Retarded Children (PARC) won a class-action suit on behalf of all children with

mental retardation in Pennsylvania. As a result of the court's decision on this case, the state of Pennsylvania was ordered to provide systematic education individually tailored to meet the developmental needs of all retarded children residing in the state. Soon after, the framework for that "systematic education" became a blueprint for Massachusetts' famed Chapter 766—which in turn foreshadowed the federal Education for All: The Handicapped Children Act of 1975. The Massachusetts special education law Chapter 766 designed the IEP to arrive at a "prototype" placement—i.e., a one-of-a-kind program individually tailored to meet a particular student's special needs.

Purpose of the IEP

In 1975, the Education for All: The Handicapped Children's Act stated that no child with a disability could be denied a special education designed to address needs resulting from that disability. This principle of "zero reject" withstood several challenges in the courts and today adds credence to one of the central arguments in the landmark Pennsylvania case: that *educability* is not the same as *schoolability* (Lippman & Goldberg, 1973). Prior to the Pennsylvania case, children whose mental age was below 6 could be denied access to an education because they were considered uneducable or not able to benefit from the offerings of regular education. The federal district court for Pennsylvania found that such an interpretation of educability was discriminatory, denying children with mental retardation access to a fundamental right to education. Separating educability from schoolability opened the door for a national special education mandate. The IEP then became the vehicle for ensuring that students with disabilities would be offered a free, appropriate, and public education (FAPE). Note that the IEP does not ensure results; nor does the IEP serve as a performance contract between a family and a school district. It is a statement of intent. Accountability is a separate step that rests with the determination of whether an IEP was implemented as proposed and approved. There are other components to federal law governing the provision of special education services, of which the IEP is only one; however, the IEP pulls all components and principles of current federal law together into a single document, making it the cornerstone of any special education program.

The process of creating an IEP begins with referral, assessment, and eligibility determination. A child thought to have a disability must be assessed by a multidisciplinary team in each area of suspected need. As described previously, disability categories suggest, through correlation, that there are always unique disability-specific needs to be considered in an IEP. Assessment determines the manifestation and extent of those needs. Once eligibility is confirmed, an IEP team, with the informed consent and participation of a student's parent(s) or guardian(s), plans a program of special education and related services designed to eliminate or reduce assessed needs. Goals, objectives, and evaluation criteria are specified. The intensity of services and necessary qualifications of personnel delivering those services are made explicit. Finally, an IEP team must determine the settings in which planned services are to be carried out. Services are to be provided in the least restrictive environment, which is defined as that environment where necessary services can best be put into place.

Since passage of the Education for All: The Handicapped Children's Act of 1975, the IEP process and its forms have undergone substantial change. It is important to underscore here some of the features of the IEP as Congress originally intended in order to clarify the current state of the IEP. First, early IEPs permitted exclusion from state-mandated assessments, as such assessments were thought to be punitive and invalid for students with disabilities. Second, goals and objectives pertained only to special education and related services. Academic work in the general curriculum, whether via a classroom instruction or tutor, was not accounted for in an IEP, unless such instruction was designed for remediation or compensation of needs or for disability-related skills training. Third, activities supportive of collaboration among a student's group of support personnel, such as consultation and co-teaching, could not be accounted for in an IEP. In short, the structure and process of early IEPs encouraged the development and maintenance of a separate system within, but quite apart from, general education. Substantially separate classrooms and pull-out programs dominated the special education delivery system, with state and federal funding formulae serving to keep the system inert. The essential difference between IEPs originally envisioned by Congress and those of today is that the principle of zero reject now applies to the general curriculum and to the state- and district-level assessment system intended to measure progress. Although students with disabilities still generally receive education specific to their specialized needs, they are no longer separated from the general

curriculum available to their non-disabled peers, nor are they automatically exempted from participation in the standards-based assessment system regularly engaged in by those same peers.

Limitations of the IEP

Karger (2004) reviewed four major summaries of IEP literature prior to the passage of IDEA '97. These analyses were independently conducted by Smith (1990), Rodger (1995), M^{c}Laughlin and Warren (1995), and the U.S. Department of Education (1995). From these four summaries, Karger inferred a general consensus in the literature that the IEP as a document and as a process possessed several shortcomings that needed to be corrected prior to IDEA's 1997 reauthorization. Inadequacies were noted in the content and quality of IEPs. For example, there was a lack of congruence between various IEP components, differences in IEP content across settings/delivery models, and a lack of connection between IEPs and the general curriculum. Further, general education teachers assumed a minimal role in the IEP process, and special education teachers had negative perceptions of the IEP as a process. In elaborating upon these shortcomings, Karger noted that the 1997 IDEA reauthorization represented an attempt to address these concerns.

IDEA '97 Challenges for the IEP

IDEA '97 laid the groundwork for including special education in the broader educational reform agenda. Specifically, IDEA '97 required that students with disabilities participate in and benefit from standards-based reform. IDEA '97 stipulated that no child with a disability could be denied access to and involvement in the general curriculum, and that no child with a disability could be excluded from participation in state- and district-wide assessments aimed at measuring academic achievement. To ensure that these new requirements would be implemented, the IEP had to become a more meaningful instructional and planning tool. The intent was to bring about this necessary change by focusing on disabled students' participation in general education standards and curriculum. Nolet and M^{c}Laughlin (2000) have listed five newly required elements of the IEP from IDEA '97:

1. A statement of a student's present level of educational performance (PLEP) must specify how his or her disability affects involvement in and progress in the general curriculum.
2. An IEP must incorporate measurable annual goals including short-term objectives or benchmarks, which must be designed to enable a student to be involved in and to progress within the general curriculum.
3. An IEP document must include identification of special education needs, related services, and supplementary aids to be provided for a student, as well as program modifications or supports for school personnel that will enable a student to be involved in and to progress within the general curriculum
4. An explanation of the extent, if any, to which a student will not participate in the general education classroom or activities must be included.
5. A description of accommodations or, if necessary, modifications, that will allow a student to participate in state- and district-level assessment systems must be included.

Taken together, these five IDEA '97 requirements for IEPs are intended to guide IEP teams in planning particulars of how a student with a disability will access, participate in, and make progress within the general curriculum. Karger (2004) has proposed a framework for analyzing the extent to which IEPs reflect access to the general curriculum. This *Karger Framework* consists of five parts, each of which corresponds to the five requirements listed above, and each of which contains a series of guidelines that can be viewed as indicators of access to the general curriculum. The Karger Framework is useful for helping team members determine if IEPs are legally correct and educationally sound.

Generating IEP goals that align with the general curriculum is a major challenge for team members. To ascertain the extent to which IEP forms actually reflect state and district standards, Thompson, Thurlow, Quenemoen, Esler, and Whetstone (2001) examined the IEP forms of 41 states. Only 5 of the 41 addressed state and district academic standards. Moreover, only 13 states had IEP forms that reflected IDEA '97 requirements that both present levels of educational performance and annual goals address the general curriculum.

When IEPs are aligned with state and district standards, a number of benefits for students with disabilities are reported to accrue. In a study by M^{c}Laughlin, Nolet, Rhim, and Henderson (1999), special education teachers reported that when IEPs are aligned with state curriculum standards, students with disabilities have greater exposure to diverse subject matter and to content-targeted instruction. Moreover, working with students who have standards-aligned IEPs increases opportunities for collaboration between special and general education teachers, which is beneficial to students' educational progress. Thompson and her colleagues (2001) have observed that educators focused less on student deficits and more on their abilities when IEPs were aligned with the general curriculum. However, aligning IEPs with state and district general curriculum standards may also create barriers for some students with disabilities. M^{c}Laughlin and her colleagues (1999) have reported that standards-aligned IEPs may minimize attention on critically important, functional life skills. This is an area of tension between special and general education team members that has yet to be resolved.

A number of approaches have been developed to assist IEP teams with the task of aligning IEP goals with state and local general curriculum standards. Walsh (2001) provided IEP team members from the state of Maryland with a matrix containing state content standards. Since Maryland had developed a set of outcomes for its alternate assessments of students with disabilities, team members were given exemplars of how to effectively align these alternate outcomes with general curriculum content standards, at age-appropriate levels. With these resources, team members were able to compare a given student's current level of performance to expectations for peers without disabilities of the same age. They were also able to identify skills needed for successful participation in the general curriculum, thus ensuring that instruction would be provided in content areas measured by Maryland's standards-based assessment system. Walsh's approach thus holds considerable promise for other states wrestling with the problem of alignment.

Once goals and objectives have been aligned with the general curriculum in an IEP, the challenge of connecting these goals with authentic classroom activities remains. Kennedy and Fisher (2001) have developed their own IEP matrix to serve as a tool for helping educators identify naturally occurring times, classes, and activities within which students' goals can be

embedded. A particular student's goals and objectives are listed across the top of their matrix, while their daily schedule is listed down its left side. For each activity in a student's daily schedule, general and special educators collaborate to determine whether a particular IEP goal can be met within the context of that activity, checking off those that can and leaving blank those that cannot. Persons responsible for addressing each goal (i.e., school, home, peer, or student) are noted at the bottom.

Massanari (2002) has devised a method to help IEP teams connect IEP components to the general curriculum. In this method, prior to a student's IEP meeting, team members are provided with a flow chart containing a series of questions to help structure the process at the meeting. According to Massanari, a student's team should begin by asking, *What are the desired outcomes for the student?* Their team should then ask what skills and knowledge would be needed to reach each outcome and assess how these compare to the content and performance expectations of the general curriculum for their student's grade level. This procedure allows the team to consider their student's PLEPs, goals, and assessment participation, as well as their specialized instruction, supports, or services, all in relation to the general curriculum. Massanari's questions are clearly helpful in focusing and guiding the thinking of IEP team members.

Addressing the General Curriculum with the IEP

Earlier sections have stressed that students with low-incidence disabilities have unique needs and require highly specialized curricular and instructional approaches designed to address those needs. How can educators continue to address significant and intensive special needs and at the same time enable access to and involvement within the general curriculum? To answer this question, it is vital that educators realize that, in essence, the goals of the general curriculum are not essentially different from the goals of special education. Broadly stated, educational goals connect with desirable adult outcomes such as living independently, participating in one's community, and securing employment. Therefore, traditional special education goals, which have always been aimed toward these ends, should be considered as naturally embedded in or aligned with general curriculum goals. To achieve the best alignment possible, IEP teams must interrogate their state- and district-level content standards and determine entry points that are

developmentally appropriate and functionally relevant for students with low-incidence disabilities. Once entry points are established, an IEP team can prioritize goals and make decisions about the instructional context in which those goals will be addressed.

Nolet and M^{c}Laughlin (2000) view curriculum access as falling along a continuum. IDEA '97 begins with the presumption that all students will fully access and succeed in the general curriculum. It is incumbent upon an IEP team to determine the extent of services (such as specially-designed instruction), supports (such as accommodations and modifications), and ancillary aids (such as assistive technologies) necessary to effect that access for each student. The point along the continuum of curriculum access where a disabled student will enter will be based on the determination of their IEP team. Students with disabilities who require only instructional and testing accommodations, such as the use of large print, would fall at one end of the continuum; they would not be eligible for special education services via an IEP unless they also required specially-designed instruction planned or provided by a special educator or related services person. (These students' needs would instead be made explicit through a 504 Accommodation Plan [deBettencourt, 2002].) At the other end of the continuum would be students who present with intensive or pervasive special needs and thus require substantial modifications to content standards and performance expectations of the general curriculum.

It is critically important for members of IEP teams to understand and apply the distinction between *accommodations* and *modifications*. Accommodations attempt to level the playing field for students with disabilities without changing standards or performance expectations of the general curriculum.

Nolet and M^{c}Laughlin (2000) describe three general categories of accommodations:

1. *Alternative Acquisition Modes* are alternative ways for students with disabilities to access the same materials used by their non-disabled peers, and change depending on the specific disability being addressed. Examples include Braille materials and voice-output computers for a blind student, or tape-recorded books and sign language interpreters for a

deaf student. These accommodations are intended to augment, bypass, or compensate for a motor, sensory, or information-processing deficit.

2. *Content Enhancements* help students recognize, organize, interpret, and remember information. Examples include, graphic organizers, concept diagrams, and semantic maps. These may also include study guides and mnemonic memory devices. These accommodations are intended to assist students with learning disabilities that affect their ability to efficiently process information.

3. *Alternative Response Modes* are multiple ways for students to express what they know or can do. Examples include assessments done via skits, role play, pantomimes, and simulations. These accommodations are intended to overcome barriers to instruction created by sensory or motor challenges that make typical written examinations unsuitable as a means of assessing progress.

Nolet and M^{c}Laughlin define *modifications* as either an alteration in subject matter or a change in a student's performance expectation. They stress the importance of making modifications within the context of broadly stated curriculum goals. Modifications to curriculum may involve teaching less of a curriculum and/or teaching different content. Early entry points to a curriculum and time constraints may result in teaching less of the curriculum, and the need to address additional instructional targets such as life skills may require the teaching of different curriculum. In either case, an IEP team should exhaust all possible and appropriate accommodations before designing modifications to curriculum. Broad-scale assessment systems, district-level assessment procedures, and local instructional practices for a disabled student still ought to align as much as possible with content standards in each state's curriculum frameworks.

Given that the goal of supplying accommodations is to level the playing field for disabled students to enable them to participate in the general curriculum, it then logically follows that the same accommodations must be applied during assessments. Otherwise, these students would not be assessed fairly against state standards of proficiency. For example, a student who is being taught to access the general curriculum using a computer to translate text to speech should be

allowed to use that same computer during assessment. Other than the necessity of making sure that the same accommodations are present during assessment as during instruction, however, an accommodated student should take the same assessments as his or her peers. When modifications are made to the curriculum, however, serious implications for changes to assessment and accountability result. Since no student may be entirely excluded from participation in state- and district-wide assessment, *alternates* must be designed to measure the extent to which a particular student has benefited from his modified curriculum.

During the planning of a student's IEP, their team must deliberate over all areas of the general curriculum that are impacted by their student's disability. All areas of the curriculum where access and involvement are hampered as a result of their student's disability must be addressed by the team either through accommodations or modifications. *Accommodations* may not require the generation of annual goals and benchmarks by the team that differ from the norm for the student's age, unless the student requires specially-designed instruction in the use of accommodations, such as assistive technology devices (in which case specific benchmarks for those special educational goals must be generated). Any *modifications* to the curriculum, however, must clearly detail the specification of individualized goals and objectives or benchmarks that can be reasonably accomplished by a student in a year's time. In cases such as this, in order for a student to progress toward her or his goals and benchmarks, modifications to the curriculum will necessitate specially-designed instruction.

Designing specialized instruction requires focused collaboration among team members, particularly general educators, special educators, and related services personnel. The general educator has knowledge of the general curriculum and its alignment with state- and district-wide standards. Special education personnel possess knowledge of the implications of disability and the elements of adaptive instruction. The special educator and related services personnel must be able to communicate—in a non-technical and jargon-free manner—a student's needs for accommodations and modifications to the general educator. Both generalists and specialists must have a clear understanding of how planned, modified curriculum will meet a student's needs in the broader context set by the general curriculum. Otherwise, their team will not achieve a sense of shared responsibility and accountability that leads to greatest student success.

Instructional environments vary widely between schools. Some classrooms employ direct instructional approaches focusing on the mastery of skill sequences in, for example, literacy and mathematics. Other classrooms may focus on thematic units, where separate skill and content areas connect, in an interdisciplinary fashion, around the creation of authentic products for portfolio assessments. Some classrooms will offer a combination of both or will use yet another approach. Regardless of the instructional approach or approaches taken, Nolet and M^{c}Laughlin (2000) state that solid curriculum analysis for purposes of IEP planning entails a three-phase process. Initially, general educators must identify critical and enduring knowledge offered by the general curriculum for all students: that is, what all students in the classroom are expected to learn. The second phase involves identifying tasks that reveal what a competent person would do to demonstrate attainment of that enduring knowledge. This phase can be well-informed for a student with a disability by input from specialists who can help general educators separate the form from the function of instruction, in order to assess questions such as *How critical and enduring is the skill of handwriting to the production of a five-paragraph essay? Can a student demonstrate the ability to craft an expressive and effective five-paragraph essay without the need for handwriting?* The third phase of curriculum analysis involves the greatest input from special educators: tasks that are determined to fairly and thoroughly demonstrate a student's competence may need to be broken down into manageable parts for direct and explicit instruction. Cognitive strategies may need to be identified to allow a student to effectively accomplish critical tasks.

Once curriculum analysis is completed, decisions need to be made about how much of the modified, specially-designed instruction can be embedded in classroom routines and how much must be taught in parallel with classroom routines. Time and pace are critical elements of instruction. In whole-class instruction, time and pace are managed with careful sequencing and homogeneous grouping, where most students are presumed to progress at the same rate. In classrooms where flexible grouping schemes and cooperative learning structures are employed, heterogeneous grouping is more easily accommodated. Again, regardless of which classroom style predominates, collaboration is key to success. A student's IEP team will have to collectively examine curriculum, instructional context, and available instructional resources in order to effectively plan for their student's access and participation.

The extent to which accommodations and modifications are designed into curriculum at the outset of the planning process can have an enormous impact upon access, participation, and progress for students with disabilities. We will address how the general curriculum itself can be made more flexible and malleable following principles of universal design. Much of this improved flexibility relies upon digital media and technology tools, but it also depends on systemic change in how curriculum resources are selected and arranged. A curriculum that accommodates all learners from the start requires less modification and fewer resources to create necessary transformations to enable disabled students to access the curriculum. A curriculum that is richly resourced for all students in, for example, captioned video and digital content, can be directly accessed more often by deaf and blind students, respectively, without elaborate and time-consuming alterations.

VIII. What approaches exist for enabling students with low-incidence disabilities to participate in state- and district-level assessment systems?

In order to form a basis for answering this very complex question, some background information is required. Standards-based reform has been well underway since the enactment of the Improving America's Schools Act of 1994. Some basic discussion must be undertaken before considering how participation in assessment systems can increase access to the general curriculum for students with low-incidence disabilities.

The Role of Assessment in Standards-Based Reform

Following over two decades of education reform in the U.S., nearly all states have established a framework for guiding local school authorities with the process of curriculum development aimed at bringing about standards-based reform. As part of this effort to ensure that schools and school districts organize and employ their resources appropriately to address state standards in core content areas, states have developed broad-scale assessment systems to measure the extent to which students are progressing and achieving proficiency in core subjects. These assessment systems are intended not only to determine individual student achievement but also to hold states and schools accountable for public investments in education reform.

Broad-scale assessment systems are summative to the extent that they purport to measure attainment of specific standards following certain multi-year instructional periods—initially at the end of grades 4, 8, and 10. While these assessments provide data which can be used to target resources and promote policy that will improve results for all students, many state assessment systems also carry high stakes for individual students. For example, grade advancement and high school graduation may be contingent upon reaching certain levels of proficiency, as measured solely by one specific test. Ideally, these tests provide schools with valuable information about the effectiveness of their instructional practices and curriculum resources. Summative information about student progress, however, is insufficient for providing local authorities with data needed to inform instruction at optimal times, since it takes place *after* a period of learning

is complete, and cannot identify and correct problems until failure has occurred. To address this shortcoming, school districts frequently develop local assessment systems in content areas based on nationally and locally generated norms. For example, using curriculum-based assessment and evaluation techniques, school systems can develop local standards of mastery and local norms that more directly and immediately inform decisions about curriculum and instruction. Schools may also develop or adopt local assessment practices at the classroom level that monitor student progress. These multiple sources of assessment data are increasingly available in schools. Together, they inform teacher decisions about their focus of instruction, alignment of curriculum with state and local standards, and the need for targeted intervention for students not making effective progress.

Broad-Scale Assessment Systems

Assessment systems yield information about individual student progress, instructional effectiveness, and alignment of curriculum with standards. Seemingly limitless comparisons among student test scores can be made, simply by aggregating the data in multiple ways. Comparisons can be made between individual classrooms, schools, or school systems, as well as between students from different racial, cultural, linguistic, and disability groups. In this fashion, assessment systems can be used to attempt to answer questions of how well our schools are doing in general, as well as detecting inequities in achievement between different student groups. Because stakeholders deserve (and at times demand) answers to such questions, assessments of this type are intended to provide a measure of accountability.

Assessment systems can be built and implemented in many different ways. States and local school authorities can design their own systems, purchase commercial systems, or adapt systems in use by other entities. The frequency of test administration and the number of core subject areas examined may be determined legislatively and then augmented according to state and/or local prerogative. The depth, elaborateness, and authenticity of tests may vary according to costs associated with development, administration, and maintenance of a chosen assessment system. Because assessment systems rely on tests as samples of student academic behavior, they may serve some criterion of efficiency and cost effectiveness. While accountability systems that

attach high stakes to single tests that sample limited domains of curriculum may be viewed as "efficient," they reveal only a narrow perspective on the intended outcomes of such a complex enterprise as education.

Assessment systems in general attempt to answer the following questions:

I. What have students learned?
II. How well were they taught?
III. How effective is a school?
IV. How effective is a school district?
V. How effective is a state in supporting local reform efforts?

Other concerns can be addressed through assessment, but critical questions in standards-based reform come down to an examination of what students have gained from their educational experience and how the public has benefited from its investment in its schools.

Standards-Based Assessment and Students with Disabilities

Since the passage of IDEA '97, these critical questions must be asked on behalf of students with disabilities as well. Modern assessments should reveal what students with disabilities gain from their experience in school and how society benefits from its investment in the futures of these students. Students with disabilities should have the opportunity to gain what all other students can gain. They should have access—in a flexible and responsive manner—to the same curriculum that is intended for all non-disabled students. They should be able to participate in the curriculum. Thus, IDEA '97's mandate to include students with disabilities in state- and district-wide assessment systems can, at least in principle, reveal the level of content mastery and the relative standings of these students in their classrooms and schools.

The 2001 reauthorization of the Elementary and Secondary Education Act, now called the No Child Left Behind Act (NCLB), represents Congress' desire to align all reform initiatives with the mandate to improve results for all students, including those with disabilities. The

historically dual worlds of general and special education, with their respective separate accountability systems, are now legally merged into one education enterprise for all students with shared mechanisms for accountability. To accomplish reform for all students, assessment systems must both identify individual students operating below acceptable proficiency levels and uncover schools that are low-performing overall. The results of these assessment systems can then be used to direct federal funding and concentrate resources in schools and communities that have demonstrated the greatest need for assistance and improvement. In order to accurately reflect any real gains brought about in response to reform, these assessments must be fair and unbiased, must yield reliable measurements, and must align with standards.

Accountability for the education of students with disabilities has suffered from documented problems arising from the existence of separate special education accountability systems and historically low participation rates for students with disabilities within general education. An urgent concern exists to improve the accountability of schools for the education of these students. As a partial answer to this concern, IDEA '97 requires states and districts to include students with disabilities in their state- and district-wide assessment programs. The assumption is that if schools are to consider the needs of students with disabilities deliberately and proactively in reform and improvement activities, outcomes for students with disabilities must be represented in public accountability systems (M^{c}Donnell, M^{c}Laughlin, & Morrison, l997).

Participation of Students with Disabilities in Assessment and Accountability Systems

To understand how participation of students with disabilities in assessment systems is managed, some background information is required. *Assessment* refers to the process employed by state departments of education and by local education agencies to systematically collect data on students. The current assessment vehicle for obtaining this data is the test, and tests can do no more than sample domains of what students are supposed to know and be able to do. They can provide no exhaustive measure of every capability a student possesses. Thus, the accuracy and predictability of tests will always fall short of certainty for any given purpose.

For students with low-incidence disabilities, participation in a fair and feasible assessment system will, in the long run, prove to be a costly undertaking. The provision of special education and related services to students with disabilities has been disproportionately expensive since the original 1975 enactment of IDEA. Federal, state, and local revenues currently absorb excess costs associated with educating students with disabilities. Since these resources are not limitless, they are distributed only to students who qualify as disabled and demonstrate a need for specially-designed instruction. It is, therefore, not unreasonable to expect that costs associated with fair and appropriate assessment for students with disabilities would also be disproportionately high, but again limited only to those who qualify for them.

Several studies have documented that, historically, participation of students with disabilities in statewide assessments has been minimal, with extensive state-to-state variation (Erickson, Thurlow, & Thor, 1995; M^{c}Grew, Thurlow, Shriner, & Spiegel, 1992; Shriner & Thurlow, 1992). This low participation rate of students with disabilities has been documented despite the difficulty of calculating comparable figures across locations and the tendency of states to calculate participation rates in ways that inflate estimates (Erickson, Thurlow, & Ysseldyke, 1996). IDEA ’97 and NCLB prohibit states and local education authorities from excluding students with disabilities from participation in both state and local assessment systems. While, in the past, participation has been minimal, the notion of a zero-reject is unprecedented (Thurlow & Johnson, 2000).

In the past, several defensible reasons for limiting participation in assessment systems have been offered. Foremost, students with disabilities have been given limited opportunity to participate in the general curriculum. It would make little sense to examine students on material with which they have had limited exposure. Additionally, assessment instruments may have contained item stimuli inaccessible to some students. Furthermore, test administration procedures may have required behaviors beyond the response repertoire of some students. Clearly, participation in assessment systems under these circumstances would seriously disadvantage students with disabilities. Moreover, the use of such unreliable and largely inaccurate data generated by these accountability systems would misrepresent the capabilities of students with disabilities and lead to flawed educational decisions.

On the other hand, state and local policies for excluding students with disabilities from participation reinforce a cycle of low expectations and altered or absent standards. Exclusion helped to maintain the world of special education as a separate place with its own isolated system of standards and accountability. Without participation, there was no means of determining the extent to which students with disabilities received an equal opportunity to learn and succeed.

Special education services and supports are comparatively expensive to operate and maintain. Eligibility is thus limited to those who qualify on the bases of age, disability status, and extent of assessed need. This presents the questions, *What do students with disabilities derive from a costly special education? What does the public gain from this entitlement?* As with standards-based reform in general education, special education programs raise these and other accountability questions. Because IDEA ’97 and NCLB prohibit exclusion from state and local assessment systems for all students with disabilities—even students with the most intensive disability-related needs—the challenge for state and local authorities is to design assessment instruments and procedures that accurately sample and measure student performance in a fair and meaningful manner. It would not be fair, for example, to assess abstract reasoning using pictures with a blind student or using verbally presented sentences with a deaf student.

Changes in Assessment Systems for Students with Disabilities

To insure that all students with disabilities can access and participate in the general curriculum, as first mandated by IDEA ’97, no student—regardless of severity of disability—can be excluded from participation in state- and district-level assessment systems intended to measure progress. A student’s IEP team (on which a general educator must now serve) determines the nature and extent of instructional accommodations and curriculum modifications necessary for that student to access the general education curriculum and to demonstrate progress by participation in state- and district-level assessments. A student’s IEP team makes a determination of each student’s need for assessment accommodations (e.g., Braille as opposed to print) or an alternate form of assessment (e.g., portfolio documentation of student accomplishments).

The National Center on Educational Outcomes at the University of Minnesota has been tracking state policies and practices on statewide testing for over a decade. As with the issue of classroom inclusion, the issue of changes in testing and measurement practices has been rife with controversy. Thurlow, Quenemoen, Thompson, and Lehr (2001) propose six core principles for states to follow in developing inclusive assessment and accountability systems (*see* Appendix E):

Building upon these principles, Lehr and Thurlow (2003) have identified five essential components of an inclusive assessment system:

1. Student participation in assessments
2. Testing accommodations
3. Alternate assessments
4. Reporting results
5. Accountability

Student participation means that no one is excluded. *Testing accommodations* ensure that students are fairly assessed. *Alternate assessments* means that students are appropriately tested. *Reporting results* refers to informing the public as well as the participants of test results, and *accountability* refers to the application of consequences regarding those results. Lehr and Thurlow assert that states must address all five components if students with disabilities are to benefit from standards-based reform.

Lehr and Thurlow also state that students with disabilities can participate in assessments in three ways:

- in the same way as other students,
- with accommodations,
- with alternate assessments (developed for students who cannot participate in general assessments even with accommodations).

Generally, test changes are grouped into two types: accommodations and modifications. *Accommodations* are changes in the way a test is given or taken but do not alter the central construct measured by the test. In contrast, *modifications* are substantial changes in the way the test is given or taken and definitely alter the construct measured by the test.

Accommodations

Accommodations are changes in standardized assessment conditions introduced to 'level the playing field' for students by removing the construct-irrelevant variance created by their disabilities (Tindal & Fuchs, 2000). According to Ysseldyke, Thurlow, M^{c}Grew, and Shriner (1994), accommodations can be grouped into the following four categories:

- Presentation adaptations, in which stimuli (materials) presented to students are modified;
- Response changes, in which students are allowed to use a different manner of responding;
- Setting adaptations, in which variations are made in the context of where tests are administered and who administers a test;
- Timing and scheduling adaptations, in which changes are made in length and quantity of how many sessions a test is administered.

Valid accommodations produce scores for students with disabilities that measure the same attributes as standard assessments measure in non-disabled students. On the one hand, disallowing valid accommodations prevents students with disabilities from demonstrating their abilities. On the other hand, overly permissive accommodation policies inflate scores and inadvertently reduce pressure on schools to increase expectations and outcomes for students with disabilities (M^{c}Donnell, et al., l997).

Broad-scale assessment systems are designed to accommodate the attention span, frustration tolerance, freedom from distractibility, sensory acuity, response capability, and developmental level of "typical" students. Students with low-incidence disabilities can be placed

at a disadvantage by participating in such systems because of the artifacts of tests and testing situations. Both standard and, in some states, non-standard accommodations are specified to allow fair participation. For example, if a student is instructed in how to compose an essay using a talking word processor, then that student must be allowed to demonstrate competence in composition using a talking word processor. The key to understanding testing accommodations is knowing that a student must independently demonstrate his or her attainment of standards. This means that scribes, translators, or test administrators cannot coach, paraphrase, or revise student products either during or after test administration.

Modifications

For students whose instruction and curriculum is substantially modified, accommodated assessment systems are inappropriate. Such students will require an alternate assessment. Alternate assessments should be administered to students with disabilities who, for a variety of reasons, cannot reasonably be expected to score at an acceptable level of proficiency on accommodated assessment systems. An alternate assessment should measure the extent to which a student has progressed against benchmarks delineated in their IEP. Goals and objectives contained in a student's IEP should address disability-specific needs but also be aimed at or embedded in a school district's general curriculum language (and also aligned with state standards). Thus, an alternate as well as an accommodated assessment must measure progress in the general curriculum, regardless of a student's extent of disability and point of entry in the general curriculum. An alternate assessment should be constructed in such a way that it is sensitive to a student's ways of knowing and doing and sufficiently robust to measure their attainment of state standards. Obviously, alternate assessment is a costly and time-consuming endeavor because it is ultimately more authentic and is tailored to an examinee.

Alternate Assessment Systems

Alternate assessments are intended to measure the proficiency of students who are unable to participate in broad-scale state assessments, either with or without accommodations. An alternate assessment establishes a mechanism for including students with significant cognitive disabilities as well as other students who may be difficult to assess in accountability systems.

Typically, a very small percentage (approximately 1%) of students may require an alternate assessment. Substantial modifications to academic content standards at grade level and the need for intensive, individualized instruction in order to acquire and generalize knowledge greatly influence a decision to include a student in an alternate assessment. Children with significant cognitive disabilities have historically been excluded from participation in state-mandated and district-wide assessments because these students are not able to take the pencil-and-paper assessments ordinarily given to the rest of the school population. While there has been a considerable amount of research done in the field of general education to help identify what skills a student labeled as proficient must possess, moves have only recently begun for "research-based evidence where quality curriculum outcomes are definable and measurable for students with significant disabilities" (Quenemoen, Rigney, & Thurlow, 2002).

State-level alternate assessments were first required as an assessment option by IDEA '97. NCLB regulations also address alternate assessment by requiring that each state, district, and school be held accountable for the achievement of all students, including those participating in alternate assessment(s). While states have differed markedly in their approach to alternate assessment since its inception, the intention is to align alternate assessments to academic content standards and to make it possible to include all students with disabilities in state and district assessments and accountability systems. States' approaches to alternate assessment differ substantially from those that states use in their general assessment system. The table below is adapted from Quenemoen, Thompson, and Thurlow (2003) have summarized five separate approaches in use by states (*see* Appendix F).

Quenemoen et al.'s work reveals that alternate assessment in some states consists of just a modified paper-and-pencil version of an original assessment given to the general education population. Alternate assessments of other states are made up of a checklist of developmental skills. In a majority of states, alternate assessments are comprised of "a body of evidence collected by educators, parents, and the student to demonstrate and document the student's skills and growth toward the state standards; sometimes the alternate assessments also incorporate characteristics of educational supports that the student receives" (Quenemoen, et al., 2002).

These types of assessments are usually gathered in portfolio form and take into account the complexity of student disabilities.

Initially, alternate assessments for students with significant cognitive disabilities focused on measuring only functional skills (Kleinert & Kearns, 1999). More recently, alternate assessments have been created to measure student achievement of state academic standards (Thompson & Thurlow, 2001). Current standards-based alternate assessment approaches have emerged in most states as a result of federal regulations and policy guidance. For example, according to NCLB regulations, states may set alternate achievement standards for alternate assessments for students with significant cognitive disabilities, but only for a maximum of 1% of the total student population in a school district. These alternate achievement standards must identify appropriate levels of proficiency within the content domains of English/Language Arts, Mathematics and, eventually, Science. Thus, alternate assessment is clearly intended to lie at one end of a continuum within each state's large-scale assessment system.

To be sure, some states have been successful in creating high-quality alternate assessments. Educators and parents in these states can truly understand what students with significant cognitive disabilities should know and be able to do as a result of their educational opportunity. From an examination of high-quality alternate assessments from separate states, Quenemoen (et al., 2002) describe five best-practice steps for states to follow in creating alternate assessments. (*See* Appendix G for a full explanation of these steps.)

With particular concern for students with significant cognitive disabilities, Ford, Davern, and Schnorr (2001) offer five principles to consider when developing and applying standards for the purpose of alternate assessment:

1. Every student should receive priority attention to the development of foundational skills.
2. Individualization is at the core of a good education.
3. Educational priorities should be pursued through schedules and locations that are respectful of a student's membership in a learning community.
4. Students should have an opportunity to experience a sense of mastery or accomplishment

over tasks they undertake.

5. Being attentive to the quality of a student's immediate experience is as important as concern for their future.

These five principles emphasize the importance of retaining ethical, person-centered gains made on behalf of students with severe disabilities, while moving forward in the current climate of standards-based reform.

Massachusetts Alternate Assessment

Massachusetts uses a portfolio approach to alternate assessment. Since Massachusetts' development and subsequent refinement of the portfolio approach has drawn considerable national attention (Wiener, 2002), it is described here in some detail as an exemplary practice. Massachusetts' alternate assessment is designed to assess proficiency in the same grade-level learning standards as does the Massachusetts Comprehensive Assessment System (MCAS) for non-disabled students. An examination of the testing schedule for the MCAS alternate assessment (MCAS-Alt) below reveals its comparability with MCAS. Note that content domains assessed in Massachusetts exceed what is currently required by NCLB.

For a student in:	MCAS-Alt, if assigned, is required in these subjects:
Grade 3	Reading and Literature (English/Language Arts Learning Standards #4–17)
Grade 4	English/Language Arts Mathematics
Grade 5	Science & Technology/Engineering[1]
Grade 6	Mathematics
Grade 7	English/Language Arts
Grade 8	Mathematics

[1] Science & Technology/Engineering portfolios must include evidence in three strands, preferably from a current school year. However, when this is not possible because the student has received Science instruction in fewer than three strands during a current year, it is permissible to include three strands spanning both a current and *one* previous school year (for this subject only).

	Science & Technology/Engineering[1]
Grade 9	—
Grade 10	English/Language Arts Mathematics

Eligibility for MCAS-Alt is determined by IEP teams after consideration of MCAS with either standard or non-standard accommodations. That is, a team must find that MCAS is inappropriate for fairly and adequately testing the student in question. Note that the above table presumes that content areas, strands within areas, and grade-level learning standards are assessed by MCAS-Alt. If a student is enrolled in an un-graded program, that student will be assessed at the grade-level corresponding to that student's chronological age.

In Massachusetts, an alternate assessment portfolio is compiled through a highly formal procedure in which evidence of proficiency is collected and documented in separate packages for each content-area strand for a grade level being tested. An MCAS-Alt portfolio consists of a year-long collection of work samples, corroborative evidence, and required instructional data documenting a student's knowledge of concepts, skills, and content outlined in the Massachusetts Curriculum Frameworks learning standards. Not all grade-level content-area strands are required to be assessed for each grade, and exceptions are permitted for students whose programs are addressing below-grade-level content-area strands when progress can be documented.

Massachusetts has developed a procedure for reviewing, evaluating, and scoring all student portfolios. The MCAS-Alt *Rubric for Scoring Portfolio Strands* is presented below. (Much of the information described pertaining to MCAS-Alt can be found at www.doe.mass.edu/mcas/alt.)

MCAS-Alt Rubric for Scoring Portfolio Strands

	1	2	3	4	5
Level of Complexity	Portfolio reflects little or no basis on *Curriculum Frameworks* learning standards in this strand.	Student primarily addresses social, motor, and communication "access skills" during instruction based on *Curriculum Frameworks* learning standards in this strand.	Student addresses *Curriculum Frameworks* learning standards that have been modified below grade-level expectations in this strand.	Student addresses a narrow sample of *Curriculum Frameworks* learning standards (1 or 2) at grade-level expectations in this strand.	Student addresses a broad range of *Curriculum Frameworks* learning standards (3 or more) at grade-level expectations in this strand.

	M	1	2	3	4
Demonstration of Skills and Concepts	The portfolio strand contains insufficient information to determine a score.	Student's performance is primarily inaccurate and demonstrates minimal understanding in this strand. (0-25% accurate)	Student's performance is limited and inconsistent with regard to accuracy and demonstrates limited understanding in this strand. (26-50% accurate)	Student's performance is mostly accurate and demonstrates some understanding in this strand. (51-75% accurate)	Student's performance is accurate and is of consistently high quality in this strand. (76-100% accurate)
Independence	The portfolio strand contains insufficient information to determine a score.	Student requires extensive verbal, visual, and physical assistance to demonstrate skills and concepts in this strand. (0-25% independent)	Student requires frequent verbal, visual, and physical assistance to demonstrate skills and concepts in this strand. (26-50% independent)	Student requires some verbal, visual, and physical assistance to demonstrate skills and concepts in this strand. (51-75% independent)	Student requires minimal verbal, visual, and physical assistance to demonstrate skills and concepts in this strand. (76-100% independent)
Self-Evaluation	Evidence of self-correction, task- monitoring, goal-setting, and reflection was not found in the student's portfolio in this content area.	Student infrequently self-corrects, monitors, sets goals, and reflects in this content area — evidence of self-evaluation was found in only one strand.	Student occasionally self-corrects, monitors, sets goals, and reflects in this content area — evidence of self-evaluation was found in two strands.	Student frequently self-corrects, monitors, sets goals, and reflects in this content area — evidence of self-evaluation was found in three strands.	Student self-corrects, monitors, sets goals, and reflects all or most of the time in this content area — two or more examples of self-evaluation were found in all three strands.
Generalized Performance		Student demonstrates knowledge and skills in one context, or uses one instructional approach and/or method of response and participation in all three strands.	Student demonstrates knowledge and skills in two or more contexts, or uses two or more instructional approaches and/or methods of response and participation in only one of three strands.	Student demonstrates knowledge and skills in two or more contexts, or uses two or more instructional approaches and/or methods of response and participation in two of three strands.	Student demonstrates knowledge and skills in two or more contexts, or uses two or more instructional approaches and/or methods of response and participation in all three strands.

Scorers examine each portfolio strand using the following criteria and generate a score for each area of the rubric based on evidence found in a portfolio (*see* scoring rubric):

- Completeness of all portfolio materials
- Level of complexity at which a student addresses learning standards found in the Massachusetts Curriculum Frameworks for the subject being assessed
- Accuracy of a student's response and/or performance
- Level of independence demonstrated by a student in performance of each task or activity
- Self-evaluation (reflection, self-correcting, goal-setting) during or after a task or activity
- Number of instructional contexts in which a student demonstrates knowledge or performs a task or activity (generalization)

A numerical score based on the *Rubric for Scoring Portfolio Strands* is generated for each rubric area for each portfolio strand: Level of Complexity (1–5), Demonstration of Skills and Concepts (1–4), and Independence (1–4). A combined score for an entire content area is generated for Self-Evaluation (1–4) and Generalized Performance (1–4). A score of "M" means there was insufficient evidence or information to generate a numerical score for a rubric area.

For each student whose classroom teacher submits an MCAS-Alt, one of the following performance levels is reported for each content area of their portfolio:

- **Incomplete—The portfolio contains insufficient evidence and information** to permit determination of a performance level in the content area.
- **Awareness—**Students at this level demonstrate **very little understanding** of learning standards and core knowledge topics contained in the Massachusetts Curriculum Frameworks in the content area. Students require extensive prompting and assistance, and their performance is primarily inaccurate.
- **Emerging**—Students at this level demonstrate a **simple understanding** of a limited number of learning standards and core knowledge topics contained in the Massachusetts Curriculum Frameworks in the content area, **below grade-level expectations.** Students

require frequent prompting and assistance, and their performance is limited and inconsistent.

- **Progressing**—Students at this level demonstrate a **partial understanding** of some learning standards and core knowledge topics contained in the Massachusetts Curriculum Frameworks in the content area, **below grade-level expectations.** Students appear to be receiving challenging instruction, and are steadily learning new skills, concepts, and content. Students require minimal prompting and assistance, and their performance is fundamentally accurate.
- **Needs Improvement—**Students at this level demonstrate a **partial understanding** of subject matter contained in the Massachusetts Curriculum Frameworks in the content area and solve some simple problems **at grade-level expectations**.
- **Proficient—**Students at this level demonstrate a **solid understanding** of challenging subject matter contained in the Massachusetts Curriculum Frameworks in the content area and solve a wide variety of problems **at grade-level expectations**.
- **Advanced—**Students at this level demonstrate a **comprehensive and in-depth understanding** of subject matter contained in the Massachusetts Curriculum Frameworks in the content area and provide sophisticated solutions to complex problems **at grade-level expectations**.

In order to qualify for a high school diploma in Massachusetts, students submitting an MCAS-Alt must complete it at a performance level of *Needs Improvement*, *Proficient*, or *Advanced* for grade 10 assessments in English/Language Arts and Mathematics. The review of a grade 10 MCAS-Alt entails a "competency determination" or an endorsement by the state of Massachusetts for high school graduation. Local school districts have additional criteria for graduation, which may or may not prevent a student from receiving a diploma. It is noteworthy that, while alternate assessment is intended for students who function presumably at lower entry points to the general curriculum, the rubric does allow students to score at an advanced level by revealing a comprehensive and in-depth understanding of grade 10 learning standards.

In addition to providing a method for summative evaluation of a student's achievement in core curriculum areas, the MCAS-Alt scoring rubric is also intended to guide and assist local

authorities with planning and implementing high-quality instructional services. The Massachusetts IEP form appropriately begins with identifying each student's present level of educational performance (PLEP) in each area of the general curriculum impacted by a student's disability. PLEPs for each grade-level subject area may be above, at, or below grade level. A student's team must determine an entry point for each content-area strand in order to specially-design instruction. The Massachusetts Department of Education web site provides both online and downloadable documentation of policies and procedures for team members to use to enable students to participate in standards-based instruction. For example, once specific learning standards are identified as a student's entry points to the curriculum, guidance is provided for their IEP team to capture the "essence of the standard" by breaking it down from more to less complex. This enables a student's IEP team to plan instruction aligned with standards above, at, or below grade-level expectations or in terms of "access skills" required to approach the standard. Essential access skills may lie in more traditional domains such as social, motor, and/or communication area(s).

Additional guidance is provided around "instructional ideas" or suggestions about how to specify instructional targets once entry points have been identified. A portfolio must contain an analysis of data collected during instruction. Templates for a variety of data recording and reporting are provided by the Massachusetts Department of Education to assist with this process. Instructional ideas also contain suggestions for implementing systematic instruction using cueing, prompting, and fading systems in addition to progress monitoring techniques. Finally, instructional ideas help teams embed instructional targets in classroom routines. These approaches require refined collaborative arrangements between special and general education teachers.

NCLB permits schools to alter standards for up to 1% of all students participating in MCAS. The table below reveals the comparability between MCAS and MCAS-Alt ratings. It shows how students participating in the MCAS-Alt assessment are evaluated against modified standards.

MCAS Proficiency Index

For students taking standard MCAS tests (and MCAS-Alt participants without significant cognitive disabilities)	
MCAS SCALED SCORE (or MCAS-Alt equivalent)	**POINTS AWARDED** (for each student)
200–208 *Failing/Warning–Low (Awareness)*	0
210–218 *Failing/Warning–High (Emerging/Progressing)*	25
220–228 *Needs Improvement*	50
230–238 *Needs Improvement*	75
240–280 *Proficient/Advanced*	100

MCAS-Alt Index

For students taking MCAS-Alt (with significant cognitive disabilities; up to 1% of all assessed students)	
MCAS-Alt SCORE	**POINTS AWARDED** (for each student)
Portfolio not submitted	0
Incomplete	25
Awareness	50
Emerging	75
Progressing	100

Allowance for altered standards at the 1% student population level limits the extent to which schools can be "punished" for the inability of students with significant cognitive disabilities to achieve grade-level academic standards.

Issues Remaining with Alternate Assessment

NCLB requires that all students attending public schools across America will reach or exceed their state's standards of academic proficiency in English/Language Arts, Mathematics, and Science by 2014. Toward that ambitious goal, schools and school districts must compute their "adequate yearly progress" (AYP) and adjust their improvement plans accordingly. Strict sanctions are in place for schools that do not progress according to projections based on the

difference between a school's initial performance rating and students' expected performance by 2014. With the exception of some "safe harbor" provisions for schools that start out with a seriously under-performing student body, all schools are expected either to make effective progress or to lose vital resources and accreditation. NCLB empowers parents to obtain compensatory services or alternative placements when schools repeatedly fail to make adequate yearly progress. Local authorities are permitted to aggregate percentages of funds from historically separate reform initiatives to concentrate resources toward achieving higher proficiency levels for low-proficiency students. Principals are required to inform parents within strict time frames if their child is being taught by an unqualified teacher. Special education personnel who teach academic subjects are required to obtain content-area licensure. These are all provisions contained in NCLB that gradually take effect to increase accountability, local autonomy, and parent choice in order to improve America's schools so that no child, including a child with a disability, will be left behind.

With IDEA '97 and NCLB, students with disabilities are fully included in assessment and accountability systems for schools, districts, and states. Many students with low-incidence disabilities, such as students who are blind, deaf, or hard-of-hearing will participate with accommodations (such as those described above). IEP teams will have to take great care to ensure that students are being neither over- nor under-accommodated. Moreover, IEP teams will have to make sure that whatever accommodations are in place for fair testing, those accommodations will also be made in the context of instruction. State assessment personnel and their designated experts will also have to ensure that constructs used to measure progress in alternate assessment systems are relevant to standards being measured.

The greatest challenge for assessment and accountability appears to lie with the alternate assessment. The very idea of including students with significant cognitive disabilities in a standards-based, state accountability system is an important innovation and step forward. The original mandate for a free, appropriate public education (FAPE) for all students with disabilities was passed in 1975. The zero-reject principle at work at that time presumed that all children can learn and that public education is a fundamental right. However, what was then considered "appropriate" was an education geared to meet the unique needs of an individual child with a

disability. What then accrued was a special education entitlement in which students with disabilities were given the opportunity to earn their way into the mainstream general education classroom.

Following two decades of unimpressive outcomes for special education students in terms of moving into the mainstream and making a successful transition into the world of work and daily life, Congress has now shifted its focus to the need for access to the general education curriculum and inclusion in standards-based reform through full participation in wide-scale assessment systems. The theory of action at work is to compel state and local authorities to take greater responsibility for, and ownership of, the learning outcomes of students with disabilities. However, learning outcomes for students with significant cognitive disabilities can not be assessed strictly in terms of levels of academic proficiency. There must be accountability for time and effort spent on addressing unique or disability-specific needs. Components of alternate assessment that document progress toward annual goals designated to reduce disability-specific need may, indeed, provide that accountability. On the one hand, an accessible general curriculum represents equal opportunity, and on the other hand, a carefully targeted special curriculum represents attention focused on human need. Here lies the essence of the dilemma. How can our one education for all children represent equal opportunity and attention to crucial needs at the same time?

A study by Browder (et al., 2004) helps to elucidate this very issue. Browder and her colleagues examined alignment of content on alternate assessments to both academic standards (Math and English/Language Arts) and functional life domains in 31 states. They first set the context for their study by reviewing the historical literature on serving students with severe disabilities. From their review, they were able to isolate three distinct shifts in curriculum focus: from a developmental skills emphasis to a functional life skills emphasis and then to a general curriculum emphasis. The shift from developmental skills to functional life skills was described as transformative—a paradigm shift. In analyzing separate states' approaches to alternate assessment(s), they hoped to learn if the shift from a functional skills curriculum to access to the general curriculum could be characterized as transformative, additive, or merely cosmetic.

Experts in Language Arts, Math, Education, and in severe disabilities, along with a group of teachers and administrators representing stakeholders, examined performance indicators on the selected 31 states' alternate assessments in terms of their alignment to national standards and curricula. Both stakeholders and experts found states that had alternate assessment performance indicators that were closely aligned to Language Arts or Math and those that did not. A smaller, sub-group of participants also considered the functionality of the indicators. Features of performance indicators that exemplified alignment with general or functional curricula were discovered by experts and stakeholders through a series of discussions. Results indicate that many states' current alternate assessments have a strong focus on academic skills, but results also suggested an additive curricular approach linking academic and functional skills. Researchers had hypothesized that curriculum transformation would be evident if performance indicators were closely aligned with the standards of the National Council of Teachers of English (NCTE) and the National Council of Teachers of Mathematics (NCTM) and were acceptable to stakeholders as reflective of Math and Language Arts curricula. On the other hand, if studied examples reflected not only Math and Language Arts standards but also continued to represent functional-curriculum and chronological-age appropriateness, the impact on curriculum would be additive. Alternatively, a cosmetic change would be evident in listings of functional skills under the headings of Math or Language Arts that did not align with NCTE and NCTM standards and were not credible to stakeholders as reflecting these content areas.

Individual and group analyses by both experts and stakeholders determined that performance indicators of only three states were in alignment with Math and Language Arts standards. Colorado began with state standards and extended them; Connecticut began with a functional curriculum and linked back to academic standards; and Arizona did both. Experts and stakeholders alike concluded that, regardless of the approach, all three of these states established performance indicators that were reflective of good access to the general curriculum. The overall findings of the Browder study reveal that experts and stakeholders will accept performance indicators that blend functional and general curriculum—indicating a trend toward merging these two types of curricula for students with severe disabilities. Clearly, this blend has not been achieved by the majority of states. Moreover, the performance indicators confirmed by the study are not necessarily relevant for all students.

While not merely cosmetic, the addition of general curriculum standards to functional life skills has a long way to go. Guidance does exist for blending the functional with the academic components of quality programs, but accountability seems to rest more heavily on the attainment of competency in core subject standards than on fulfillment of critical needs for students with low-incidence disabilities. As states move forward in this endeavor, it will prove increasingly important not to lose sight of program components that address disability.

IX. How can a UDL framework increase access to the general curriculum for students with low-incidence disabilities?

Support for the application of universal design principles to the design of educational technology, media, materials, learning environments, and teaching routines appears to be widespread. Wood (2002) cites Lou Danielson from the U.S. Office of Special Education Programs as stating that the concept of universal design supports the kind of teaching practice that enables students to reach educational goals. Nolet and M^{c}Laughlin (2000), Wehmyer (et al., 2002), Male (2003) and Turnbull (et al., 2002) all list CAST Inc.'s principles for the universal design of learning environments. Such broad-based support for this new framework for curriculum reform is evidence of great promise that the flexibility UDL can provide will greatly facilitate the complex processes of teaching and learning for all students, including those with disabilities.

We began with a broad exploration of universal design in order to provide background information on UD as an idea, presented several perspectives and applications, and concluded with a description of the Universal Design for Learning (UDL) framework. UDL, as envisioned by Rose and Meyer (2002), applies to learning in general. In the present context, however, UDL applies more directly to curriculum design. The principles of UDL we have outlined are intended to serve as a framework for guiding curriculum reform. Ensuring access to the general curriculum includes increasing student involvement/participation in the general curriculum, as well as the provision of opportunities for students to demonstrate effective progress in the general curriculum as measured by fair and appropriate assessment systems. Greater access may be gained through reforming the general curriculum according to the principles of UDL. We now present an array of solutions inspired or implied by UDL to improve curriculum access for students with low-incidence disabilities.

Universal Design Revisited

Previously, we described the built environment as a kind of recapitulation of a natural ecological layout, once inhabited by early humans. The terrain of the natural environment, along with the structures that occupied that terrain, simply afforded a wide range of human behaviors. The built environment, in essence, simply brought under control the location and distribution of those affordances. Instead of having to locate a place that afforded river crossing, a built bridge recapitulated (and improved upon) structures in nature that allowed a river to be crossed. The evolutionary concept of natural selection dictates that the fittest of humans survive. These humans have tended to fashion a built environment to suit their own purposes and preferences. A "survival of the fittest" notion would predict that the built environment would bear a resemblance to and be a refinement of the natural environment. However, humans have evolved into creatures with a highly complex central nervous system that supports widely variant behaviors and characteristics. Consequently, the built environment in all its myriad manifestations reflects the values, preferences, and needs of its designers and users, not just a simple recapitulation of the natural environment.

The needs and preferences of individuals who differ markedly from the norm have not often been taken into account by designers and builders at most periods of human history. The elderly and the disabled, for example, were almost always marginalized by the built environment and compelled to find place in alternate environments. Such alternate environments were often isolating and self-perpetuating. Normative community standards and practices emerged from such ostracism and became entrenched in the broader society, largely inert to the possibility of change. Misguided notions of care and protection toward this marginalized subpopulation took hold as a means of bringing their ostracism in line with values espoused by the majority of a community. People on the margins have always been in the minority, and, as such, have historically had their needs and wishes ignored by the majority. Only democratic ideals of fundamental rights, empowerment, and self-determination have challenged this legacy of social isolation and exclusion. The universal design movement in architecture stands as one example of

how these ideals can successfully overcome or challenge this legacy of disempowerment by offering new perspectives on old, exclusionary habits of thought.

Many who have extolled the virtues of universal design cite sidewalk curb cuts as a prime example of how UD approaches and accomplishes change. Wheelchairs are liberating for people with motor challenges, but still present barriers to mobility in environments that contain steep grades, sidewalk curbs, and stairways. One way to reduce these physical barriers is to improve wheelchair technology to help overcome these remaining problems, and this is indeed a laudable pursuit. On the other hand, the UD way of thinking encourages changing the design of environments to accommodate current wheelchair technology, rather than waiting for wheelchair technology to solve these problems, since individuals in wheelchairs need solutions to these problems as soon as possible and not in some potential, far-off future where all wheelchairs are technologically advanced enough to overcome virtually all obstacles. Curb cuts are solutions that can be easily implemented today, using currently available technology, and thus represent a preferable solution to waiting around for technological improvements that may never come. As an unexpected side benefit, however, the introduction of curb cuts to assist wheelchair users also turns out to assist many other members of the general population who are not disabled. For example, people who frequently use baby strollers, skateboards, in-line skates, and shopping carts also benefit from the wide-scale availability of curb cuts. These incidental and unanticipated benefits of UD attract a great deal of attention, for they heavily imply that changes made based on UD principles benefit a far greater number of people than were originally targeted by those changes, and in ways that we can rarely accurately predict. Moreover, designs that consider UD from the start provide aesthetic benefits as they seamlessly integrate functionality with structure from the beginning; retrofitting existing designs, by contrast, often yields ugly add-ons that are unappealing and sometimes inefficient for their purpose(s). Consistent and thoughtful application of UD to the built environment, therefore, reflects a pro-active approach to advancing a democratic and inclusive society.

In an ideal democratic society, communities (and the environments in which they are situated) should be freely accessible by all members of that society to the maximum extent feasible. Congress made this right clear and explicit with the passage of the Vocational

Rehabilitation Act of 1973. Section 504 of that Act has prohibited discrimination against citizens with disabilities by entities funded or assisted by the federal government. Later, in 1990, Congress extended this prohibition to the private sector by insisting that *all* entities engaging in commerce with the public make every reasonable accommodation to provide access to citizens with disabilities.

UDL and the Curriculum

The Improving America's Schools Act of 1994 set the stage for each student to receive a curriculum based on standards in core subject areas and for schools and school districts to be held accountable for student academic achievement through state administered assessment systems. IDEA '97 first extended participation in standards-based reform to include all students with disabilities. NCLB required schools and school districts to ensure that all students make "adequate yearly progress" toward those state standards. With the exception of 1–3% of school-aged students—those with significant cognitive disabilities who may pursue alternate standards—all students must be held to the same standards of proficiency.

Just as UD in architecture has opened up communities to the widest possible range of citizens, so too can UDL transform and help deliver a curriculum to the widest possible range of students. Federal legislation has guided educational reform since 1994 by setting great value on a single, high-quality education for all students. Just as there is a need to continue improving wheelchair design and functionality, there is a need to advance the development of tools and intervention strategies to reduce the impact of disability in our schools. UD in architecture dramatically improved the mobility of wheelchair users. UDL applied to curriculum dramatically improves access, participation, and progress in the general curriculum for students with disabilities. In the same way that curb cuts advocated by UD yielded unforeseen positive consequences for the non-disabled, UDL has the potential to provide learning benefits to the non-disabled student population even as it opens the doors to the general curriculum for students with disabilities. In envisioning a curriculum designed according to the principles of UDL, Rose and Meyer (2002) argued that the flexibility and malleability of a curriculum rich in new digital media and technology tools would also support the needs of students without disabilities.

Students who are English language learners, students who score below proficiency on state assessments, and students who are gifted and talented can all benefit from a curriculum that is no longer fixed or static. The traditional, one-size-fits-all curriculum is proving to be an entirely inadequate solution for problems that plague our schools in this era of standards-based reform. The textbook, a mainstay of traditional curriculum, is static in form and, by its design, inaccessible to students who are blind or dyslexic. It is also quite a hostile medium for students who have organizational difficulties, attentional challenges, or cognitive impairments. New means of presenting material are required.

At a time when students with disabilities were excluded from pursuing state standards and participating in state-level accountability systems, special or parallel curriculum for addressing the disability-related needs of students was defensible (Hitchcock, et al., 2002). Priorities dictated an approach that focused on deficits rather than on opportunities. Today, with the requirement that *all* students, including students with disabilities, must participate in and benefit from standards-based reform, previously static, inflexible curriculum must be transformed into a more flexible system of resources. UDL can accomplish this transformation.

UDL Components

UDL is founded on a view of individual differences quite distinct from that of traditional psychometrics. Psychometrics from the time of Binet asserted that a single, underlying trait called "intelligence," which varied only in quantity or amount but not in underlying nature, accounted for academic achievement. UDL is based on new brain research (Rose & Meyer, 2002) that asserts that the intelligence of individuals differs qualitatively according to how three distinct neural networks interact. Virtually infinite combinations of learning preferences emerge in an individual based on variation in the way they receive information, act upon it strategically, and engage in learning activities affectively. If human intelligence varied quantitatively according to a single factor, the logical implication would be that the more of this single attribute an individual possessed, the more of the curriculum they could absorb, and, therefore, the more material they should be able to access. Historically, an extension of this logic has led to tracking or ability grouping, and an entirely separate, usually inferior, curriculum for students with

disabilities. However, from a UDL perspective, qualitative differences in the ways in which individuals learn implies that similar qualitative differences are possible and should be available in the curriculum itself so that each learner may approach it in the manner best suited to her or his preferred learning mode. To guide this qualitative transformation of curriculum, UDL advances three main design principles (Rose & Meyer, 2002) based on three brain networks recognized by neuroscience:

1. To support diverse *recognition* networks, educators should provide multiple, flexible methods of presentation. For example, when introducing students to a new concept or unit, a teacher may provide multiple structures in presenting information, such as a lecture, a digitized text, an activity-based exploration, or a demonstration.

2. To support diverse *strategic* networks, educators should provide multiple, flexible methods of expression and apprenticeship. For example, when a teacher requests student responses to demonstrate understanding and knowledge, he or she could provide a range of tools that allow students to respond in various formats, such as in writing, orally, with a slide show, with a video, or with a drawing.

3. To support diverse *affective* networks, educators should provide multiple, flexible options for engagement. For example, a teacher may allow students to select from an area of interest within a topic to research or study. Students could be allowed free selection instead of forced assignment of one of the natural resources in a geographic area under study to obtain in-depth information.

In forging a new view of curriculum fashioned from these three main design principles, Hitchcock (et al., 2002a; 2002b) examined four essential components of curriculum: goals, methods, materials, and assessments.

Goals

Goals come from standards, and standards are now generally applicable to all students. UDL dictates that goals must be stated broadly to allow educators and designers to incorporate necessary accommodations or alternate entry points to curriculum. In writing an essay, for example, goals should allow for the use of assistive technologies as alternatives to paper and pencil. Goals should also allow students to use photographs to tell a story at a lower level of literacy, if this is the level of entry for a particular student. Broadly-stated goals require members of an IEP team to do the hard work of selecting appropriate accommodations (as defined earlier). For example, general educators and special educators working together should be able to establish meaningful accommodations and modifications that provide necessary instructional support while allowing the appropriate level of challenge.

For example, Braille reading and writing tools and/or the use of screen-reading software and hardware are appropriate and meaningful accommodations for a blind student to employ in accessing and working with Social Studies content. When used in the classroom, these accommodations should carry through into assessment as well. On the other hand, having a classroom aide read the content of a lesson aloud and write down a student's spoken responses would not be appropriate accommodations. Having such "over-accommodations" in place would deprive blind students of the opportunity to establish independent literacy skills in reading and writing. Without a solid team approach, the appropriate type and level of accommodations for each student may not be identified and supported. For example, a qualified teacher of the visually impaired would complete a learning media assessment (LMA) for a blind student and implement an instructional program in literacy skills for him or her, such as Braille reading and writing and the use of assistive technologies. On the same team, a highly-qualified teacher of Social Studies would have subject-matter knowledge and expertise in designing units that bring content to life. Together, these teachers would provide an opportunity for greatest likelihood that their blind student would achieve high standards in an independent and authentic manner.

Broadly-stated goals can allow students with significant cognitive impairments to enter core content domains at developmentally appropriate and meaningful levels. Again, the collaborative potential of an IEP team is crucial to implementing instruction that targets a

student's functional skills while retaining the integrity of a content area. For example, composing an essay consisting of a sequence of photos to tell a story about a field trip could have embedded within it a myriad of functional skill clusters as well as prerequisites of essay writing. Such an achievement for a severely disabled student could be assessed as an alternate proficiency standard within the framework of English/Language Arts.

Methods

Teaching methodologies abound. Some so-called effective teaching practices function independently of subject matter, while other pedagogies vary with content area being taught. Some methodologies are cognitive in nature, providing students with advance organizers, big-picture perspectives, puzzlements, or purpose-setting activities. A student learning from a cognitive perspective proceeds as a manner of "hypothesis testing" in which activities unfold to confirm or deny what students predict or expect.

Contrasting methodologies are behavioral in focus, breaking complex learning down into manageable sequences of stimulus-response connections. Student learning progresses through chains of simple to complex skill sequences in which cues are made explicit and redundant, and responses are relatively easy to chart for data collection and analysis.

The effectiveness of any particular methodology varies depending on the characteristics of learners and the context in which learning occurs (Jackson, Harper, & Jackson, 2002). Diversity and heterogeneity in the classroom, therefore, require teachers to select and apply a variety of teaching approaches from those methods with which they have an acceptable level of expertise (Jackson & Harper, 2002). UDL can greatly enhance almost any teaching approach because it assists teachers with systematic thinking about modes of presentation, forms of expression, and alternatives for engagement.

Rose and Meyer (2002) provide a series of UDL templates to support teacher planning. UDL templates allow teachers to profile their students according to their strengths and challenges in the three areas of reception, expression, and engagement. Additional templates guide teachers to discover curriculum and instructional barriers and to identify UDL solutions.

While it appears that UDL is heavily reliant upon digital media and technology tools, the principles of UDL apply quite reasonably to a wide range of instructional methodologies, many of which are low-tech in nature. Cooperative learning, flexible grouping, peer-mediated instruction, and thematic learning are all well grounded in the research literature (Jackson, Harper, & Jackson, 2002), and when applied to classroom instruction, provide the kinds of flexibility that UDL requires. Teachers can plan student activities that utilize multiple means of representation, expression, and engagement based on their analyses of student profiles generated by completed UDL templates (Rose & Meyer, 2002).

Materials

Hands-on material in a typical curriculum is predominantly print-based, and, as such, it is static and inflexible. For example, a page in a textbook displays information (print and images) in one way only. If that display is not accessible to blind or dyslexic or other students, the textbook must somehow be transformed so that it can be "re-displayed" in Braille or through synthetic speech. Many years ago, this process involved hand-transcription into Braille or reading text into a tape recorder. Later, this process involved scanning text into a computer and converting the scanned images into text files for Braille translation or synthetic speech output. While these earlier approaches have not been completely abandoned, more recently, the process of transforming print-based materials has involved obtaining digital source files for textbooks and stripping away non-essential or unnecessary code to render a digital document more easily convertible to Braille or e-text for text-to-speech access. Although a remarkable advancement over hand translation, even this process often fails to get materials into the hands of blind, dyslexic, and other students at critical points of instruction (i.e., when non-disabled students access materials).

An analogy can be drawn between educational materials in a curriculum and physical structures in architecture. It is inconceivable that a public school building could be constructed today without wheelchair access. It should be equally untenable for public schools to purchase curriculum materials that are inaccessible to students with disabilities, who are entitled by federal and state law to receive a free, appropriate public education (FAPE). Access, participation, and progress in the general curriculum requires far more than access to physical spaces in classrooms

and school buildings. Schools and school districts must make every reasonable effort to ensure that students with disabilities have on-time access to the same instructional resources as non-disabled students. A case-by-case reactive approach on the part of schools and school districts is hardly feasible; and because it rarely succeeds, it cannot be considered a reasonable solution.

As with adapting physical environments, the solution to adapting curriculum materials resides in their design. Fortunately, much of the hard work has already been done by the publishing industry. The current state-of-the-art in publishing dictates that a textbook begins in digital form. Interestingly, many approaches to making textbooks accessible result in restoring the textbook to something resembling its original digital state before conversion (for example, to Braille). Textbooks and other instructional resources consist of many digital elements (text, tables, images) electronically laid out in "pages" using software. These digital source documents drive the modern-day equivalent of the printing press. They can now be rendered in a file format that makes them easily transformable into accessible media for qualifying students with disabilities and, potentially, other students.

Stahl (2004) has recently reviewed the current status and future prospects of accessible materials. He notes that 80% of curriculum in schools is driven by the ubiquitous textbook and that schools spend, on average, $10,000 per year on textbook purchases. Clearly, textbooks are the mainstays of the American educational enterprise. Exemption from federal copyright law (known as the Chaffee Amendment) allows recognized not-for-profit entities to convert published textbooks into alternative accessible media for so-called print-disabled individuals, without obtaining permission from the publisher or rights holder. Stahl points out a number of ambiguities in the 'Chaffee exemption' that account for a wide range of practices among organizations devoted to providing accessible materials to individuals with disabilities. Stahl also describes a vast array of requirements with which textbook publishers must comply in order to do business with many states. The current state of the textbook transformation industry, according to Stahl, is a largely inefficient, redundant, and ineffective system for getting accessible materials into the hands of students in need at the point of instruction.

The National Instructional Materials Accessibility Standard (NIMAS)

Stahl details a remedy on the horizon for this dilemma: the National Instructional Materials Accessibility Standard (NIMAS). The NIMAS is a standard of guidelines for the production of digital source files for print-based materials based on XML and the DAISY Consortium's ANZI/NISO 239.86 file format standard, the purpose of which is to enable publishers and others to provide standardized source files of their content from which a variety of outputs can be produced. (For more information, see http://nimas.cast.org/.) Educational publishers welcome a single file format into which they can now render their source documents, rather than having to respond to separate state mandates or individual appeals from local schools. Conversion houses—authorized entities that transform digital source documents into Braille, e-text, or large print—also welcome a single, workable file format. The NIMAS, now part of the IDEA amendments of 2004, is intended to streamline the process of transforming print materials into accessible digital resources for students with disabilities.

As of this writing, the NIMAS is a standard in its infancy. It holds great promise for the future, outlining specifications to make materials accessible not just to blind and dyslexic students, but also to deaf students and those with significant cognitive challenges. Any curriculum based on standards that is intended to be applicable to every student will have to be accessible. Digital media and technology tools can provide that access, and many other learners and their teachers will discover the value of flexible digital media—an impact of perhaps even greater significance. As Rose and Meyer (2000) state, "the future is in the margins." Looking ahead to innovations in educational technology, Meyer and Rose have argued that what is learned about the benefits of UDL for students on the margins will one day benefit all learners. Just as curb cuts and captioned television benefit a far wider population than originally envisioned, so too will the flexibility found in digital media benefit English language learners, low-proficiency students, and those with special gifts and talents.

In the near future, the NIMAS will unleash the power of accessible multimedia. Text transformed from NIMAS-compliant files will have text-to-speech capability, including images; collapsible/expandable content display; adjustable reading levels; and embedded definitions,

comprehension prompts, instructional supports, and assessment(s). All of this flexibility can be designed into universally accessible multimedia. Such is the promise of UDL for students with a wide variety of learning needs and interests.

Assessment

Assessment must occur on many levels, and it must accomplish multiple purposes. Formative assessment in classrooms may occur daily to provide a continuous record of progress. Diagnostic testing in Reading and Math, for example, may occur episodically to identify skills deficits. Curriculum-based evaluation and standardized achievement testing may occur regularly to measure curriculum and instruction effectiveness. Standards-based or large-scale assessment may be carried out to determine proficiency against state standards. For any given student, school personnel must be able to take apart or disaggregate these multiple sources of information to plan further instruction, select curriculum resources, and measure progress. For all students, including students with disabilities, assessments must be accurate and measure only what they are intended to measure. For students with disabilities, assessment procedures may currently require an entirely alien response set and consequently end up measuring behavior unrelated to the intended purpose of an assessment. For example, blind students who learn concepts using three-dimensional models may not recognize the critical features of these models when they are displayed as two-dimensional, tactile graphics.

To the greatest extent possible, assessments must be authentic, requiring students to perform skills and create products in a manner similar to that in which they have learned those skills and product creation during instruction. The more accessible digital content and technology tools are infused or integrated into curriculum, the more assessment must incorporate the use of these assets. Accessible digital content and technology tools widen the range of learner characteristics that can be included in a learning environment. That is, technology extends the reach of curriculum to a more diverse population of students. By applying UDL to assessment as well as to instructional and learning materials, UDL's flexibility results in the same greater access and widened participation in testing as it does in teaching and learning.

For example, when assessments are built into a learning medium, they can provide students with immediate corrective feedback. More dramatically, content complexity can be adjusted dynamically to a student's level of challenge. When learning media contain built-in assessments, monitoring and reporting of student progress is greatly facilitated. With digital content and delivery, the distinction between curriculum and assessment becomes less apparent. Assessment informs both student and teacher and adjusts such features of curriculum as pace and mode of presentation.

Dolan and Hall (2001) and Dolan and Rose (2000) describe how large-scale assessments can be greatly improved through the application of principles of UDL. Standard accommodations for students with disabilities are generally adaptations of the traditional paper-and-pencil test format. As with the example of a hard copy textbook cited above, such adaptations are usually far from optimal and often measure constructs not intended for assessment by a test developer; for example, a student's performance on a Math test may depend more heavily on their ability to read the questions than on their ability to solve its Math problems. Designing assessment systems from the ground up to be accessible would remove or reduce many of the impediments to obtaining accurate and valid measures of student performance. Digital assessments would permit multiple and flexible modes of item presentation, multiple and flexible means of responding to item prompts, and a variety of ways of engaging students in the assessment process.

Curriculum Flexibility for Students with Low-Incidence Disabilities

Students with low-incidence disabilities constitute a small subset of the total number of students with disabilities. Although they present with a wide variety of complex disabilities, students in this category have been aggregated because they present unique challenges for local schools and communities. Their needs tend to arise from significant medical-related issues, and therefore they tend to have severe and/or complex health-related challenges in obtaining a public education. Consequently, greater intensities of supports are frequently necessary to enable school and community inclusion. Highly specialized services and supports often require specialized environments and highly-trained personnel to support daily routines. Families and other decision-makers must consider the concept of the least restrictive environment somewhat

differently than conventional wisdom would suggest. The school nearest a student's home may not prove to be their "least restrictive environment." Thus, schools and communities must continue to identify a range of placement options for students with low-incidence disabilities. While acknowledging these and other challenges, we present a series of recommendations that increase access, participation, and progress in the general curriculum for students with low-incidence disabilities:

1. *Schools must make their general curriculum explicit.* How do local school mission and vision statements align with their state's standards? What community standards and practices are embedded in the general curriculum? What values, preferences, and statements about quality-of-life or ideal adult outcomes are reflected in the general curriculum?

2. *Schools must examine their curriculum in terms of its flexibility.* To what extent do current curriculum resources lend themselves to multiple means of presentation to learners? To what extent do current curriculum resources enable a variety of means for learners to demonstrate what they know and can do? To what extent do current curriculum resources permit a variety of alternative means of engagement?

3. *Schools and communities must adopt a life-cycle approach for planning and coordinating supports for low-incidence-disability students from birth into adulthood.* IEP teams must determine students' current levels of performance (entry points) within state frameworks of the general curriculum. How do current levels of intensities of supports align with curriculum frameworks? How can instructional resources be arranged to blend essential life skills with entry points in the general curriculum?

4. *Schools and communities must adopt a full-services perspective for integrating comprehensive services for students and families.* What are the medical, legal, recreational, and respite resources available in the community that could wrap around families through cooperative agreement to achieve better, more enduring results?

5. *IEP teams must actively engage general education personnel to ensure responsiveness of general curriculum offerings.* What model of collaboration will work best to ensure that content-area experts contribute to planning processes along with special education and related services personnel?

6. *IEP teams must assist families with the identification of open-ended, quality-of-life, person-centered goals.* What are the potential sources of informal supports in a school and a community? How can extended family members, neighbors, and circles of friends support students and their families?

7. *IEP teams must align person-centered goals with general curriculum frameworks and determine individually appropriate instructional accommodations and curriculum modifications*. What skills need to be taught? How can skills be supported or assisted? What skills can be embedded in the general curriculum?

8. *IEP teams must determine what specially-designed instruction, resources, and ancillary aids are necessary for achieving goals for their students.* What access or compensatory skills need to be taught in order engage students more productively in the general curriculum and prepare them for independent community living?

9. *Criteria for standards attainment and/or the qualities of authentic products must be specified in an IEP and regarded as outcomes for program accountability.* Assessment accommodations and alternate assessments need to be better grounded in meaningful and more authentic tasks.

10. *Access to and participation in the general curriculum must be enabled through the creation or adoption of universally designed curriculum resources.* States and local school authorities must commit to the NIMAS in selecting and/or developing instructional materials.

11. *Assists must be selected from an array of options to support students' independent participation in instructional environments and testing situations.* Where curriculum falls short of universal design, technologies need to be applied that afford the greatest amount of autonomy and independence along with the least amount of restriction.

12. *Schools and communities must identify a means of dignifying the successes of students who complete a free, appropriate, and public school education and transition into adulthood as independent, productive, and participating citizens*. Success must be defined more broadly than high school graduation. Students must be recognized for their unique accomplishments.

References

Abel, G. L. (1959). The education of blind children. In Cruickshank, W. M. & Johnson, G. O. (Eds.). *Education of exceptional children and youth*. Englewood Cliffs, NJ: Prentice Hall.

Allen, K. E. & Schwartz, I. S. (1996). *The exceptional child: Inclusion in early childhood education*. Albany, NY: Delmar.

American Psychiatric Association. (1994). *Diagnostic and statistical manual*. (4th Ed.). Washington, D.C.

Andrews, J. F., Ferguson, C., Roberts, S., & Hodges, P. (1997). What's up, Billy Jo? Deaf children and bilingual-bicultural instruction in East-Central Texas. *American Annals of the Deaf, 142*(1), 16-25.

Barraga, N. (1964). *Increased visual behavior in low vision children.* New York, NY: American Foundation for the Blind.

Baumgart, D. & Brown, L., et al. (1982). Principle of partial participation and individualized adaptations in educational programs for severely handicapped students. *The Journal of the Association for Persons with Severe Handicaps, 7*, 17-27.

Benz, M., Lindstrom, L., & Yovanoff, P. (2000). Improving graduation and employment outcomes of students with disabilities: Predictive factors and student perspectives. *Exceptional Children, 66,* 509-529.

Berard, G. (1993). *Hearing equals behavior.* New Canaan, CT: Keats.

Biklen, D. (1990). Communication unbound: Autism and praxis. *Harvard Educational Review,* 60, 291-314.

Blackorby, J. & Wagner, M. (1996). Longitudinal post-school outcomes of youth with disabilities: Findings from the National Longitudinal Transition Study. *Exceptional Children, 62*(5), 399-414.

Blasch, B., Wiener, W., & Welsh, R. (Eds.). (1997). *Foundations of orientation and mobility* (2nd Ed.). New York, NY: AFB Press.

Bowe, F. G. (2000). *Universal design in education: Teaching non-traditional students*. Westport, CT: Bergin & Garvey.

Browder, D. (2001). *Curriculum and assessment for students with moderate and severe disabilities.* New York, NY: Guilford.

Browder, D., Flowers, C., Ahlgrim-Delzell, L., Karvonen, M., Spooner, F., & Algozzine, R. (2004). The alignment of alternate assessment content with academic and functional

curricula. *Journal of Special Education*. *37*(4), 211-225.

Browder, D. M. & Snell, M. E. (2001). Teaching functional academics. In Snell, M. E. & Brown, F. (Eds.), Instruction of students with severe disabilities (5th Ed.). 493-542. Upper Saddle River, NJ: Merrill.

Brown, L., Nietupski, J., & Hamre-Nietupski, S. (1976). The criterion of ultimate functioning and public school services for severely handicapped students. In *Hey, don't forget about me: Education's investment in the severely, profoundly and multiply handicapped*. 2-15. Reston, VA: Council for Exceptional Children.

Bryant, B. & Seay, P. C. (1998). The Technology-Related Assistance to Individuals with Disabilities Act: Relevance to individuals with learning disabilities and their advocates. *Journal of Learning Disabilites, 31*(1), 4-15.

Bulgren, J. A., Deshler, D. D., & Schumaker, J. B. (1997). Use of a recall enhancement routine and strategies in inclusive secondary classes. *Learning Disabilities Research and Practice*, 12(4). 198-208.

Carr, E. G., Pridal, C., & Dorse, P. A. (1984). Speech versus sign comprehension in autistic children: Analysis and prediction. *Journal of Experimental Child Psychology, 37*, 587–597.

Cawley, J. F. & Vitello, S. J. (1972). Model for arithmetical programming for handicapped children. *Exceptional Children*, *39*(2), 101-110.

Chen, D. (Ed.). (1999). *Essential elements in early intervention: Visual impairment and multiple disabilities.* New York, NY: AFB Press.

Cooper, J. O., Heron, T. E., & Heward, W. Ll (1987). *Applied behavior analysis*. Upper Saddle River, NJ: Prentice-Hall.

Corn, A. L. (2000). Overview, assistive devices and technology. In Silverstone, B., Lang, M., Rosenthal, B., & Faye, E. (Eds.), *The lighthouse handbook on visual impairments and vision rehabilitation*. 903-906. New York, NY: Oxford University Press, Inc.

Corn, A. L., Hatlen, P., Huebner, K. M., Ryan, F., & Siller, M. A. (1995). *The national agenda for the education of children and youths with visual impairments, including those with multiple disabilities*. New York, NY: AFB Press.

Corn, A. L. & Huebner, K. M. (1998). Report to the nation: The national agenda for the education of children and youths with visual impairments, including those with multiple disabilities. New York, NY: American Foundation for the Blind.

Cuban, L. (1995). The hidden variable: How organizations influence teacher responses to secondary science curriculum reform. *Theory Into Practice, 34*(1), 4-11.

Culatta, R. A. & Tompkins, J. R. (1999). *Fundamentals of special education: What every teacher needs to know.* Upper Saddle River, NJ: Merrill.

Danielson, L. (1999). Universal design: Ensuring access to the general education curriculum. *Research Connections, 5,* 2-3.

Dempsey, I. & Foreman, P. (2001). A review of educational approaches for individuals with autism. *International Journal of Disability, Development & Education, Special Issue 48*(1), 103-116.

Dolan, R. P. & Hall, T. E. (2001). Universal Design for Learning: Implications for large-scale assessment. *IDA Perspectives, 27*(4), 22-25.

Dolan, R. P. & Rose, D. H. (2000). Accurate assessment through Universal Design for Learning. *Journal of Special Education Technology,* 15(4).

Drasgow, E., Yell, M. L., & Robinson, T. R. (2001). Developing legally correct and educationally appropriate IEPs. *Remedial and Special Education, 22*(6), 359-374.

Drew, C. J., Logan, D. R., & Hardman, M. L. (1992). *Mental retardation: A life cycle approach.* (5th Ed.). New York, NY: Macmillan.

Dunlap, G. & Robbins, F. R., et al. (1994). Parents' reports of their children's challenging behaviors: Results of a state-wide survey. *Mental Retardation, 32,* 206-212.

Dunn, J. M. (1997). *Special physical education: Adapted, individualized, developmental.* (7th Ed.). Madison, WI: Brown & Benchmark.

DuPaul, G. J. & Eckert, T. L. (1998). Academic interventions for students with attention-deficit/hyperactivity disorder: A review of the literature. *Reading and Writing Quarterly: Overcoming Learning Difficulties, 14*(1), 59-82.

DuPaul, G. J. & Henningson, P. N. (1993). Peer tutoring effects on the classroom performance of children with attention deficit hyperactivity disorder. *School Psychology Review, 22*(1), 134-43.

Easterbrooks, S.R. & Mordica, J.A. (2000). Teachers' ratings of functional communication in students with cochlear implants. *American Annals of the Deaf, 145*(1), 54-59.

Eisner, E. H. (2001). What does it mean to say a school is doing well? *Phi Delta Kappan, 82*(5), 367-373.

Eisner, E. (1994). *The educational imagination: On the design and evaluation of school programs*. New York, NY: Macmillan College Publishing.

Erickson, R. N., Thurlow, M. L., & Thor, K. (1995). State special education outcomes, 1994. Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes (ERIC Document Reproduction Service No. ED 404 799).

Erickson, R. N., Thurlow, M. L., & Ysseldyke, J. E. (1996). Neglected numerators, drifting denominators, and fractured fractions (Synthesis Report 23). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Falvey, M., Givner, C. C., & Kimm, C. (1996). What do I do on Monday morning? In Stainback, W. & Stainback, S. (Eds.), *Inclusion: A guide for educators*. Baltimore, MD: Paul H. Brookes.

Ferrell, K. A. (1985). *Reach out and teach*. New York, NY: American Foundation for the Blind.

Fisher, D. & Frey, N. (2001). Access to the core curriculum: Critical ingredients for student success. *Remedial and Special Education, 22*(3), 148-157.

Fisher, D., Frey, N., & Sax, C. (1999). Inclusive elementary schools: Recipes for individualizing success. Colorado Springs, CO: PEAK Parent Center.

Ford, A. & Davern, L., et al. (2001). Learners with significant disabilities: Curricular relevance in an era of standards-based reform. *Remedial and Special Education, 22*(4), 214-223.

Forest, M. & Lusthause, E. (1990). Everyone belongs with MAPs action planning system. *Teaching Exceptional Children*, 22, 32-35.

Frampton, M. E. (1940). *Education of the blind: A study of teaching the blind*. Yonkers-on-Hudson, NY: World Book.

Furlonger, B. (1998). An investigation of the career development of high school adolescents with hearing impairment in New Zealand. *American Annals of the Deaf, 143*(3), 268-276.

Galvan, D. (1999). Differences in the use of American Sign Language morphology by deaf children: Implications for parents and teachers. *American Annals of the Deaf, 144*(4), 320-324.

Gargiulo, R. M. (2003). *Special education in contemporary society: An introduction to exceptionality*. Belmont, CA: Wadsworth/Thomson Learning.

Geyer, L. A., Kurtz, L. A., & Byarm, L. E. (1998). *Promoting function in daily living skills.* Baltimore, MD: Paul H. Brookes.

Giangreco, M. F. (1996). “The stairs don’t go anywhere!” A self-advocate’s reflections on specialized services and their impact on people with disabilities. (An invited interview.) *Physical Disabilities and Related Services, 14*(2), 1-12.

Giangreco, M. F., Cloninger, C. J., & Iverson, V. S. (1998). *Choosing outcomes and accommodations for children (COACH): A guide to educational planning for students with disabilities.* Baltimore, MD: Paul H. Brookes.

Glatthorn, A. A. (1999). Curriculum alignment revisited. *Journal of Curriculum and Supervision, 15*(1), 26.

Goldstein, H. (1969). Construction of a social learning curriculum. *Focus on Exceptional Children*, 1(2), 1-10.

Grushkin, D.A. (1998). Lexidactylophobia: The (irrational) fear of fingerspelling. *American Annals of the Deaf, 143*(3), 404-415.

Hallahan. D. P. & Kaufman, J. M. (2002). *Exceptional Learners. (*8th Ed.). Needham Heights, MA: Allyn & Bacon.

Hallahan, D. P. & Kauffman, J. M. (2000). *Exceptional Learners.* (7th Ed.). Needham Heights, MA: Allyn & Bacon.

Harrower, J. K. (1999). Educational inclusion of children with severe disabilities. *Journal of Positive Behavior Interventions, 1*(4), 215-230.

Hathaway, W. (1959). *Education and health of the partially seeing child.* (4th Ed.). New York, NY: Columbia University Press.

Hatlen, P. (1996). *The core curriculum for the blind and visually impaired students, including those with additional disabilities*. New York, NY: American Foundation for the Blind.

Hatlen, P. (1996a). The core curriculum for blind and visually impaired students, including those with additional disabilities. *Re:view, 28*(1), 25-32.

Hatlen, P. (1996b). The core curriculum for blind and visually impaired students, including those with additional disabilities. Austin, TX: Texas School for the Blind and Visually Impaired. Retrieved April 20, 2002 (http://www.tsbvi.edu/agenda/corecurric.htm).

Hatlen, P. H. & Curry, S. A. (1987). In support of specialized programs for blind and visually impaired children: The impact of vision loss on learning. *Journal of Visual Impairment & Blindness, 81*(1), 7-13.

Heller, K. W., Alberto, P. A., Forney, P. E., & Schwartzman, M. N. (1996). *Understanding physical, sensory, and health impairments*. Pacific Groves, CA: Brooks/Cole.

Heumann, J. E. & Hehir, T. (1997). Believing in children: A great IDEA for the future. *Exceptional Parent, 27*(9), 38-42.

Heward, W. L. (1996). *Exceptional children: An introduction to special disabilities*. (5th Ed.). Upper Saddle River, NJ: Merrill.

Heward, W. L. (2003). *Exceptional children: An introduction to special disabilities*. (7th Ed.). Upper Saddle River, NJ: Merrill.

Hitchcock, C. G., (2001). Balanced instructional support and challenge in universally designed learning environments. *Journal of Special Education Technology*, 16(4), 23-30.

Hitchcock, C. G., Meyer, A., Rose, D., & Jackson, R. (2002a). Providing new access to the general curriculum: Universal design for learning. *Teaching Exceptional Children, 35*(2), 8-17.

Hock, M. (2000). Standards, assessments, and Individualized Education Programs: Planning for success in the general education curriculum. In Villa, R. A. & Thousand, J. S. (Eds.), *Restructuring for caring and effective education: Piecing the puzzle together*. 208-241. Baltimore, MD: Paul H. Brookes.

Holbrook, M. C. & Koenig, A. J. (Eds.). (2000). *Foundations of education, volume I: History and theory of teaching children and youths with visual impairments*. (2nd Ed.) New York, NY: American Foundation for the Blind.

Horner, R. H. & Carr, E. G. (1997). Behavioral support for students with severe disabilities: Functional assessment and comprehensive intervention. *Journal of Special Education, 31*, 84-104.

Horner, R. H., Flannery, K. B., & Snell, M. E. (1996). Educational strategies for students with severe intellectual disabilities. Eugene, OR: University of Oregon, National Center to Improve the Tools of Educators (http://idea.uoregon.edu:16080/~ncite/documents/techrep/tech03.html).

Horner, R. H., Albin, R. W., Sprague, J. R., & Todd, A. W. (2000). Positive behavior support. In Snell, M. & Brown, F. (Eds.), *Instruction of students with severe disabilities* (5th Ed.). 207-243. Upper Saddle River, NJ: Merrill/Prentice Hall.

Howell, K. & Nolet, V. (2000). *Curriculum-based evaluation*. Altanta, GA: Wadsworth.

Hunt, N. & Marshall, K. (1999). *Exceptional children and youth*. Boston, MA: Houghton Mifflin.

Hunt, P. & Goetz, L. (1997). Research on inclusive educational programs, practices, and outcomes for students with severe disabilities. *The Journal of Special Education, 31*(1), 3-29.

Hurley-Geffner, C. M. (1995). Friendships between children with and without developmental disabilities. In Koegel, R. L. & Koegel, L. K. (Eds.), *Teaching children with autism:*

Strategies for initiating positive interactions and improving learning opportunities. Baltimore, MD: Paul H. Brookes.

Individuals with Disabilities Education Act (IDEA) amendments. IDEA Practices web site. Retrieved February 16, 2001 (http://www.ideapractices.org/).

Jackson, P. W. (1968). *Life in classrooms*. New York, NY: Holt, Rinehart, and Winston.

Jackson, R., Harper, K., & Jackson, J. (2002). *Effective teaching practices and the barriers limiting their use in accessing the curriculum: A review of recent literature*. Wakefield, MA: Center for Applied Special Technology, Inc. (http://www.cast.org/ncac/index.cfm?i=1942).

Jackson, R. & Harper, K., (2002). Teacher planning and the universal design for learning environments. Wakefield, MA: Center for Applied Special Technology, Inc. (http://www.cast.org/ncac/index.cfm?i=1941).

Jackson, R. M. (1983). Early educational use of optical aids: A cautionary note. *Education of the Visually Handicapped*, 15, 20-29.

Kaméenui, E. J. & Simmons, D. C. (1999). *Towards successful inclusion of students with disabilities: The architecture of instruction*. Reston, VA: Council for Exceptional Children.

Kamps, D. M., Walker, D., Maher, J., & Rotholz, D. (1992). Academic and environmental effects of small group instruction arrangements in classrooms for students with autism and developmental disabilities. *Journal of Autism and Developmental Disorder*, 22, 277-293.

Karger, J. (2004). *Access to the general curriculum for students with disabilities: The role of the IEP*. Wakefield, MA: Center for Applied Special Technology, Inc.

Kennedy, C. H. & Fisher, D. (2001) *Inclusive middle schools*. 55-56. Baltimore, MD: Paul H. Brookes.

King-Sears, M. E. (2001). Institutionalizing peer mediated instruction in schools. *Remedial and Special Education, 22*(2), 89-103.

Kirk, S., Gallagher, J., & Anastasiow, N. (2000). *Educating exceptional children*, (9th Ed.). Boston, MA: Houghton Mifflin.

Kleinert, H. L. & Kearns, J. F. (1999). A validation study of the performance indicators and learner outcomes of Kentucky's alternate assessment for students with significant disabilities. *The Journal of the Association for Persons with Severe Handicaps*, 24, 100-110.

Knoors, H. & Renting, B. (2000). Measuring the quality of education: The involvement of bilingually educated deaf children. *American Annals of the Deaf, 145*(3), 268-274.

Koegel, L. K., Harrower, J. K., & Koegel, R. L. (1999). Support for children with developmental disabilities in full-inclusion classrooms through self-management. *Journal of Positive Behavior Interventions, 1*, 26-34.

Koenig, A. J., & Holbrook, M. C. (Eds.). (2000). *Foundations of education, volume II: Instructional stategies for teaching children and youths with visual impairments.* (2nd Ed.) New York, NY: American Foundation for the Blind.

Koenig, A. J. & Holbrook, M. C. (1995). Learning media assessment of students with visual impairments: A resource guide for teachers. (2nd Ed.). Austin, TX: Texas School for the Blind and Visually Impaired.

Koestler, F. (1976). The unseen minority: A social history of blindness in the United States. New York, NY: David McKay.

Kohler, F. W., Strain, P. S., & Hoyson, M. (1995). Using a group-oriented contingency to increase social interactions between children with autism and their peers: A preliminary analysis of corollary supportive behaviors. *Behavior Modification, 19*, 10-32.

Kohn, A. (2000). Burnt at the high stakes. *Journal of Teacher Education, 51*(4), 315-327.

Konarski, E. A. & Diorio, M. S. (1985). A quantitative review of self-help research with the severely and profoundly mentally retarded. *Applied Research in Mental Retardation*, 6(2), 229-45.

LaSasso, C. L. (1999). Test taking skills: A missing component of deaf students' curriculum. *American Annals of the Deaf, 144*(1), 35-43.

Leffert, J. S., Siperstein, G. N., & Millikan, E. (2000). Understanding social adaptation in children with mental retardation: A social-cognitive perspective. *Exceptional Children, 66*(4), 530-545.

Lehr, C. & Thurlow, M. (2003). *Putting it all together: Including students with disabilities in assessment and accountability systems* (Policy Directions No. 16). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes (http://education.umn.edu/NCEO/OnlinePubs/Policy16.htm).

Levack, N. (1994). *Low vision: A resource guide with adaptations for students with visual impairments.* Austin, TX: School for the Blind and Visually Impaired.

Lewis, R. B. & Doorlag, D. H. (1999). *Teaching special students in general education classrooms*. (5th Ed.). Upper Saddle River, NJ: Merrill/Prentice Hall.

Lippman, L. & Goldberg, I. I. (1973). Right to education: Anatomy of the Pennsylvania case. New York, NY: Teachers College Press.

Locke, W. R. & Fuchs, L. S. (1995). Effects of peer-mediated reading instruction on the on-task behavior and social interaction of children with behavior disorders. *Journal of Emotional and Behavioral Disorders, 3*(2), 92-99.

Lowenfeld, B. (Ed.). (1973). *The visually handicapped child in school*. New York, NY: John Day.

Magnuson, N. I. (2000). Infants with congenital deafness: On the importance of early sign language acquisition. *American Annals of the Deaf, 145*(1), 6-14.

Male, M. (2003). *Technology for inclusion: Meeting the special needs of all students*. Boston, MA: Allyn & Bacon.

Marcinkiewicz, H. R. (1994). Subjective norms predicting computer use. In *Proceedings of selected research and development presentations at the 1994 national convention of the association for educational communications and technology sponsored by the research and theory division* (16th, Nashville, TN; February 16-20, 1994) (ERIC Document Reproduction Service No. ED 373 739).

Marzano, R. J. (1999) Building curriculum and assessment around standards. *High School Magazine, 6*(5), 14-19.

Massanari, C. B. (2002). *Connecting the IEP to the general curriculum: A talking paper*. Des Moines, IA: Mountain Plains Regional Resource Center (ERIC Document Reproduction Service No. ED 469 280).

Mason, D. & Ewoldt, C. (1996). Whole language and deaf bilingual-bicultural education—Naturally! *American Annals of the Deaf,* 141(4), 293-98.

Matson, J. L. (1990). *Handbook of behavior modification with the mentally retarded*. New York, NY: Plenum Press.

McDonnell, L. M. & McLaughlin, M. J., et al. (Eds.). (1997). *Educating one and all: Students with disabilities and standards-based reform*. Washington, D.C.: National Research Council Committee on Goals 2000 and the Inclusion of Students with Disabilities.

McGrew, K. S., Thurlow, M. L., Shriner, J. G., & Spiegel, A. X. (1992). Inclusion of students with disabilities in national and state data collection systems (Technical Report 2). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

McLaughlin, M. J. (1999). Access to the general education curriculum: Paperwork and procedure or redefining special education. *Journal of Special Education Leadership, 12*(1): 9-14.

M[c]Laughlin, M. J., & Warren, S. H. (1995). *Individual education programs: Issues and options for change*. (Final Report for the Office of Special Education Programs). Alexandria, VA: National Association of State Directors of Special Education (ERIC Document Reproduction Service No. ED385 038).

M[c]Laughlin, M. J., Nolet, V., Rhim, L. M., & Henderson, K. (1999). Integrating standards: Including all students. *Teaching Exceptional Children*, 31(3), 66-71.

M[c]Lean, M. & Bailey, D. B., et al. (1996). *Assessing infants and preschoolers with special needs*. (2nd Ed.). Upper Saddle River, NJ: Merrill/Prentice Hall.

Meyen, E. J. (1996). *Exceptional children in today's schools.* Denver, CO: Love.

Miles, B. (2000). *Overview of deaf-blindness*. DB-LINK: The National Information Clearinghouse On Children Who Are Deaf-Blind. Retrieved May 28, 2003 (http://www.tr.wou.edu/dblink/ovrview2.ht).

Moores, D. E. (1996). *Educating the deaf: Psychology, principles, and practices*. Boston, MA: Houghton Mifflin.

Morgan, R. L., Moore, S. C., M[c]Sweyn, C. A., & Salzberg, C. L. (1992). Transition from school to work: Views of secondary special educators. *Education and Training in Mental Retardation*, *27*(4), 315-323.

Moss, K. & Hagood, L. (1995). *Teaching strategies and content modifications for the child with deaf-blindness.* Austin, TX: Texas School for the Blind and Visually Impaired.

Mount, B. (1992). Person-centered planning: Finding directions for change using personal futures planning. New York, NY: Graphics Futures, Inc.

Nolet, V. & M[c]Laughlin, M. J. (2000). *Accessing the general curriculum: Including students with disabilities in standards-based reform.* Thousand Oaks, CA: Corwin Press.

Orelove, F. P. & Sobsey, D. (1991). *Educating children with multiple disabilities: A transdisciplinary approach.* (2nd Ed.). Baltimore, MD: Paul H. Brookes.

Orkwis, R. & M[c]Lane, K. (1998). *A curriculum every student can use: Design principles for student access* (ERIC/OSEP Topical Brief). Reston, VA: Council for Exceptional Children.

Pagliaro, C. (1998a). Mathematics reform in the education of deaf and hard of hearing students. *American Annals of the Deaf, 143*(1), 22-28.

Pagliaro, C. (1998b). The mathematics preparation and professional development of deaf education teachers. *American Annals of the Deaf, 143*(5), 373-379.

Patton, J. R., Beirne-Smith, M., & Payne, J. S. (1990). *Mental retardation*. (3rd Ed.) Columbus, OH: Merrill.

Paul, P. V. & Quigley, S. P. (1990). *Education and deafness*. White Plains, NY: Longman.

Pearpoint, J., Forest, M., & O'Brien, J. (1996). MAPs, Circles of Friends, and PATH. In *Inclusion: A guide for educators*. Stainback, S. & Stainback, W. Baltimore, MD: Paul H. Brookes. 67-86.

Pearpoint, J., O'Brien, J., & Forest, M. (1993). Path: A workbook for planning possible positive futures: Planning alternative tomorrows with hope for schools, organizations, businesses, families. Toronto, Canada: Inclusion Press.

Perske, R. (1988). *Circle of friends: People with disabilities and their friends enrich the lives of one another*. Nashville, TN: Abingdon Press.

Pillai, P. (1999). Using technology to educate deaf and hard of hearing children in rural Alaskan general education settings. *American Annals of the Deaf*, *144*(5), 373-378.

Powell, S. & Nelson, B. (1997). Effects of choosing academic assignments on a student with attention deficit hyperactivity disorder. *Journal of Applied Behavior Analysis*, *30*(1), 181-183.

Pugach, M. C. (2001). The stories we choose to tell: Fulfilling the promise of qualitative research for special education. *Exceptional Children*, 67(4), 439-53.

Pugach, M. C. & Warger, C. L. (2001). Curriculum matters: Raising expectations for students with disabilities. *Remedial and Special Education*, 22(4), 194-198.

Pugach, M. C. & Warger, C. L. (Eds.). (1996). *Curriculum trends, special education, and reform: Refocusing the conversation*. New York, NY: Teachers College Press.

Quenemoen, R. F., Thompson, S. J., & Thurlow, M. (2003). *Measuring academic achievement of students with significant cognitive disabilities: Building understanding of alternate assessment scoring criteria*. Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Quenemoen, R. F., Thompson, S. J., Thurlow, M. L., & Lehr, C. A. (2001). *A self-study guide to implementation of inclusive assessment and accountability systems: A best practice approach*. Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Quenemoen, R., Rigney, S., & Thurlow, M. (2002). *Use of alternate assessment results in reporting and accountability systems: Conditions for use based on research and practice* (Synthesis Report 43). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes (http://education.umn.edu/NCEO/OnlinePubs/Synthesis43.html).

Rabbi, R. & Croft, D. (1989). *Taking charge: A strategic guide for blind job seekers.* Boston, MA: National Braille Press.

Rademacher, J. A., Schumaker, J. B., & Deshler, D. D. (1996). Development and validation of a classroom assignment routine for inclusive settings. *Learning Disability Quarterly, 19*(3), 163-178.

Rapin, I. (1997). Autism. *New England Journal of Medicine*, *337*, 97–104.

Reid, W. (1996). The administrative challenges of block scheduling. *The School Administrator*, 53(8), 26-30.

Rex, E. J. & Koenig, A. J., et al. (1994). *Foundations of Braille literacy*. New York, NY: American Foundation for the Blind.

Rivard, J. D. (1995). *Technology, teaching, and learning*. Needham Heights, MA: Simon & Schuster.

Rodger, S. (1995). Individual education plans revisited: A review of the literature. *InternationalJournal of Disability, Development and Education*, *42*(3), 221-239.

Rose, D. H. & Meyer, A. (2002). *Teaching every student in the digital age: Universal design for learning*. Alexandria, VA: Association for Supervision and Curriculum Development.

Rose, D. H. & Meyer, A. (2000). *The Future is in the margins: The role of technology and disability in educational reform* (A report prepared for the U. S. Department of Education's Office of Special Education Technology). Washington, D.C.: U. S. DOE.

Ross, D. M. & Ross, S. A. (1972). *An intensive training curriculum for the health of young educable mentally retarded children* (Final Report on Project 142106 and H932106A to the Bureau of Education for the Handicapped). San Francisco, CA: University of California Medical Center.

Ryndak, D. L. & Alper, S. (1996). *Curriculum content for students with moderate and severe disabilities in inclusive settings*. Boston, MA: Allyn & Bacon.

Ryndak, D. L. & Alper, S. (2003). *Curriculum and instruction for students with significant disabilities in inclusive settings*. (2nd Ed.). Boston, MA: Allyn & Bacon.

Sacks, S. Z. & Silberman, R. K. (1998). *Educating students who have visual impairments with other disabilities*. Baltimore, MD: Paul H. Brookes.

Sands, D. J. & Kozleski, E. B., et al. (2000). *Inclusive education for the twenty-first century.* Belmont, CA: Wadsworth.

Schafer, W. D. (1991). Essential assessment skills in professional education of teachers. *Educational Measurement: Issues and Practice*, *10*(1), 3-6,12.

Scholl, G. T. (1986). What does it mean to be blind? Definitions, terminology, and prevalence. In Scholl, G. T. (Ed.), *Foundations of education for blind and visually handicapped children and youth*. 145-164. New York, NY: American Foundation for the Blind.

Scott, S., M^{c}Guire, J., & Shaw, S., (2001). *Principles of Universal Design for Instruction*. Storrs, CT: Univesity of Connecticut, Center on Postsecondary Education and Disability.

Sherrill, C. (1993). *Adapted physical activity, recreation, and sport: Cross-disciplinary and lifespan*. (4th Ed.). Dubuque, IA: Wm. C. Brown.

Shriner, J. G. & Thurlow, M. L. (1992). State special education outcomes 1991. Minneapolis, MN: University of Minnesota National Center on Educational Outcomes.

Sigafoos, J., Kerr, M., Roberts, D., & Couzens, D. (1994). Increasing opportunities for requesting in classrooms serving children with developmental disabilities. *Journal of Autism and Developmental Disorders, 24*, 631-645.

Simeonnson, R. J., Olley, J. G., and Rosenthal, S. L. (1987). Early intervention for children with autism. In Guralnick, M. J. & Bennett, F. C. (Eds.), *The effectiveness of early intervention for at-risk and handicapped children*. 275-296. New York, NY: Plenum.

Smith, S. (1990). Individualized education programs (IEPs) in special education—From intent to acquiescence. *Exceptional Children, 57(1)*, 6-14.

Snell, M. E. & Janney, R. (1993). Including and supporting students with disabilities within general education. In Billingsley, B. S. (Ed.), *Program leadership for students with disabilities*. 219-262. Richmond, VA: Virginia Department of Education.

Stahl, S. (2004). The promise of accessible textbooks: Increased achievement for all students. Wakefield, MA: Center for Applied Special Technology, Inc.

Stephens, B. (Ed.). (1971). *Training the developmentally young.* New York, NY: John Day.

Stubbs, L. B. (1990). A study of the effects of technology training on teacher productivity and empowerment (Doctoral dissertation, University of North Texas, 1990). *Dissertation Abstracts International*, 52,101.

Sugai, G. & Sprague, J. R., et al. (2000). Preventing school violence: The use of office discipline referrals to assess and monitor school-wide discipline interventions. *Journal of Emotional and Behavioral Disorders, 8*, 94-101.

Swenson, A. M. (1999). *Beginning with Braille: First-hand experiences with a balanced approach to literacy*. New York, NY: AFB Press.

Thompson, S. J. & Thurlow, M. L. (2001). 200l state special education outcomes: A report on state activities at the beginning of a new decade. Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Thompson, S. J., Thurlow, M. L., Quenemoen, R. F., Esler, A., & Whetstone, P. (2001). *Addressing standards and assessments on state IEP forms* (NCEO Synthesis Report 38). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Thurlow, M., Quenemoen, R., Thompson, S., & Lehr, C. (2001). *Principles and characteristics of inclusive assessment and accountability systems* (Synthesis Report 40). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Thurlow, M. L. & Johnson, D. R. (2000). High stakes testing for students with disabilities. *Journal of Teacher Education, 51*(4), 289-298.

Tindal, G. & Fuchs, L. (2000). A summary of research on test change: An empirical basis for defining accommodations. Lexington, KY: University of Kentucky Mid-South Regional Resource Center.

Turnbull, H. R. & Turnbull, A. P. (1998). *Free appropriate public education*. Denver, CO: Love.

Turnbull, A. & Turnbull, R. (1992, Fall & Winter). Group action planning (GAP). *Families and Disability Newsletter*, 1-13.

Turnbull, R. & Turnbull, A., et al. (2002). *Exceptional lives: Special education in today's schools*. Upper Saddle River, NJ: Merrill/Prentice Hall.

Tuttle, D. & Tuttle, N. (1996). *Self-esteem and adjusting with blindness*. (2nd Ed.). Springfield, IL: Charles C. Thomas.

U.S. Department of Education (1995). *Individuals with disabilities education act amendments of 1995: Reauthorization of the Individuals with Disabilities Education Act (IDEA)*. Washington, D.C.: U. S. DOE.

Vaughn, S., Hughes, M. T., Schumm, J. S., & Klingner, J. K. (1998). A collaborative effort to enhance reading and writing instruction in inclusive classrooms. *Learning Disabilities Quarterly, 21*, 57-74.

Vanderwood, M. L., Ysseldyke, J. E., & Thurlow, M. L. (1993). *Consensus building: A process for selecting educational outcomes and indicators*. Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Walsh, J. M. (2001). Getting the big picture of IEP goals and state standards. *Teaching Exceptional Children, 33*(5), 18–26.

Warger, C. L. & Pugach, M. C. (1993). A curriculum focus for collaboration. *LD Forum, 18*(4): 26-30.

Waterhouse, L. & Morris, R., et al. (1996). Diagnosis and classification in autism. *Journal of Autism and Developmental Disorders, 26*, 59–86.

Wehmeyer, M. L., Sands, D. J., Knowlton, H. E., & Kozleski, E. B. (2002). *Providing access to the general curriculum: Teaching students with mental retardation*. Baltimore, MD: Paul H. Brookes.

Wessel, J. A. (1975). *Project I CAN: Individualized curriculum design for mentally retarded children*. East Lansing, MI: Michigan State University.

Westling, D. L. & Fox, L. (1995). *Teaching students with severe disabilities.* Englewood Cliffs, NJ: Merrill.

Wiener, D. (2002). *Massachusetts: One state's approach to setting performance levels on the alternate assessment* (Synthesis Report 48). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes (http://education.umn.edu/NCEO/OnlinePubs/Synthesis48.html).

Wilde, L. D., Koegel, L. K., & Koegel, R. L. (1992). *Increasing success in school through priming: A training manual.* Santa Barbara, CA: University of California.

Will, M. C. (1986). Educating children with learning problems: A shared responsibility. *Exceptional Children, 52*, 111-145.

Wolffe, K. E. (1999). *Skills for success: A career education handbook for children and adolescents with visual impairments*. New York, NY: American Foundation for the Blind.

Wolffe, K. E. & Sacks, S. Z. (2000). *Focus on: Social skills*. New York, NY: American Foundation for the Blind.

Wood, J. W. & Lazzari, A. M.(1997). *Exceeding the boundaries: Understanding exceptional lives*. Orlando, FL: Harcourt Brace.

Wood, J. W. (1997). *Intervention taxonomy levels*. Richmond, VA: Judy Wood.

Wood, J. W. (2002). *Adapting instruction to accommodate students in inclusive settings.* Upper Saddle River, NJ: Pearson.

Woodward, J. & Baxter, J. (1997). The effects of an innovative approach to mathematics on academically low-achieving students in inclusive settings. *Exceptional Children, 63*(3), 373-88.

Wormsley, D. P. & D'Andrea, F. M. (Eds.). (1997). *Instructional strategies for Braille literacy*. New York, NY: AFB Press.

Ysseldyke, J., Thurlow, M., M^{c}Grew, K. S., & Shriner, J. G. (1994). Recommendations for making decisions about the participation of students with disabilities in statewide assessment programs (Synthesis Report 15). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Zanolli, K., Daggett, J., & Adams, T. (1996). Teaching preschool age autistic children to make spontaneous initiations to peers using priming. *Journal of Autism and Developmental Disorders, 26*(4), 407-422.

Appendices

Appendix A: Tips for Universally Designed Teaching

1. *Become aware of your own culture's teachings and how those affect you as an educator.* Learn how the cultures of your students may predispose them to approach education differently than you do. In particular, examine the factor of time, the relative importance of academic work *vs.* family needs if/when the two conflict, and the perceptions regarding individual *vs.* group achievements.

   > Example: *As a product of Eurocentric cultures, I automatically value promptness in my students, expect them to complete their academic work even if family needs intervene, and measure performance by each student individually. Those are my biases. When I have students who come from other cultural traditions, I need to recognize that their values may well differ from mine; occasionally, I bend, and sometimes I expect them to bend.*

2. *Provide students with options for demonstrating knowledge and skills.* Those options should include not only traditional tests and term papers but also group activities, demonstration via activities in the community and/or in the classroom, and portfolios of achievements. This rich variety of alternatives responds to variances in student learning styles and preferences.

3. *Offer instruction, and accept student work, at a distance.* Attending class in person is not an option for some people; it is inconvenient for others. Today, email, the WWW, and the increasing availability of broadband telecommunications (which transports voice, video, and data over a phone line all at the same time) make distance learning a viable alternative for many people.

4. *Alert students to availability of digitized texts (e-books).* Not all distance-learning students will need them, but some will, and so will some students who are blind or have dyslexia: the already enormous volume of electronic (digital) books and other reading materials available offers exciting options for universally designing instruction.

5. *Offer students information in redundant media.* If your lectures were prepared on disk, make copies available. Upload the lecture and other hand-outs to a web page, where students can read them using personal adaptive technologies such as screen enlargers and speech synthesis. It is very important that the same information be offered in all employed alternative ways. This includes things you say or show in class.

6. *Provide the support students need to improve accuracy and speed.* For example, some students do far better when they can dictate something than when they write or type it. Computer speech recognition has matured to the point that it understands a person's voice quite well and thus may be used for dictation.

7. *Translate important materials to other languages as needed by your students*. Computer software that translates between English and other languages has matured to the point that it provides "draft quality" translations. If possible, ask a colleague who is fluent in the target language to polish the product.

8. *Choose physically accessible locations for your classes.* If you have a choice, select a room with desks and chairs that are movable rather than one with fixed seats.

Appendix B: Principles of Universal Design for Instruction (UDI)

Principle	Definition
Principle 1: Equitable use	Instruction is designed to be useful to and accessible by people with diverse abilities. Provide the same means of use for all students: identical whenever possible, equivalent when not.
Principle 2: Flexibility in use	Instruction is designed to accommodate a wide range of individual abilities. Provide choice in methods of use.
Principle 3: Simple and intuitive use	Instruction is designed in a straightforward and predictable manner, regardless of a student's experience, knowledge, language skills, or current concentration level. Eliminate unnecessary complexity.
Principle 4: Perceptible information	Instruction is designed so that necessary information is communicated effectively to students, regardless of ambient conditions or students' sensory abilities.
Principle 5: Tolerance for error	Instruction anticipates variation in individual student learning pace and required skills.
Principle 6: Low physical effort	Instruction is designed to minimize inessential physical effort in order to allow maximum attention to learning. Note: This principle does not apply when physical effort is integral to essential requirements of a course.
Principle 7: Size and space for approach and use	Instruction is designed with consideration for appropriate size and space for approach, reach, manipulations, and use, regardless of a student's body size, posture, mobility, and communication needs.
Principle 8: A community of learners	The instructional environment promotes interaction and communication among students and between students and faculty.
Principle 9: Instructional climate	Instruction is designed to be welcoming and inclusive. High expectations are espoused for all students.

Appendix C: Design Principles for Lesson Adaptations

Adapt Lessons to Reach All Students

Principle	Criterion/Feature
I. Concepts or principles that facilitate the most efficient and broad acquisition of knowledge	• Focus on essential learning outcomes • Capture rich relationships among concepts • Enable learners to apply what they learn in varied situations • Involve ideas, concepts, principles, and rules central to higher-order learning • Form the basis for generalization and expansion
II. Useful steps for accomplishing a goal or task	• Planned • Purposeful • Explicit • Of medium-level application • Most important in initial teaching of concept
III. Instructional guidance provided by teachers, peers, materials, or tasks	• Varied according to learner needs or experiences • Based on task (not more than learner needs) • Provided in the form of tasks, content, and materials • Removed gradually according to learner proficiency
IV. Integrating knowledge as a means of promoting higher-level cognition	• Combines cognitive components of information • Results in a new and more complex knowledge structure • Aligns naturally with information (i.e, is not “forced”) • Involves meaningful relationships among concepts • Links essential ideas across lessons within a curriculum
V. Structured opportunities to recall or apply previously taught information	• Sufficient • Distributed over time • Cumulative • Varied • Judicious, not haphazard
VI. Preexisting information that affects new learning	• Aligns with learner knowledge and expertise • Considers strategic and proximal pre-skills • Readies learner for successful performance

Appendix D: Expanded Core Curriculum for Blind/Low Vision Students

- **Compensatory or Functional Academic Skills, Including Communication Modes**

Compensatory and functional skills include such learning experiences as concept development, spatial understanding, study and organization skills, speaking and listening skills, and adaptations necessary for accessing all areas of existing core curriculum. Communication needs vary by student, depending on degree of functional vision, effects of additional disabilities, and a given task to be completed [or performed]. Students may use Braille, large print, print with the use of optical devices, regular print, tactile symbols, a calendar system, sign language, and/or recorded materials to communicate. Regardless, each student will need instruction from a teacher with professional preparation to instruct students with visual impairments in each of the compensatory and functional skills they need to master. These compensatory and functional needs of visually impaired students can be significant, and are not addressed with sufficient specificity in the existing core curriculum.

- **Orientation and Mobility**

As part of an expanded core curriculum, orientation and mobility is a vital area of learning. Teachers who have been specifically prepared to teach orientation and mobility to blind and visually impaired learners are necessary. Students will need to learn about themselves and the environment in which they move—from basic body image to independent travel in rural areas and busy cities. Existing core curriculum does not include provision for this instruction. It has been said that the two primary effects of blindness on the individual are communication and locomotion. An expanded core curriculum must include emphasis on the fundamental need and basic right of visually impaired persons to travel as independently as possible, enjoying and learning from the environment through which they are passing to the greatest extent possible.

- **Social Interaction Skills**

Almost all social skills used by sighted children and adults have been learned by visually observing the environment and other persons and behaving in socially appropriate ways based on that information. Social interaction skills are not often [or are rarely] learned casually and incidentally by blind and visually impaired individuals as they are by sighted persons. Social

skills must be carefully, consciously, and sequentially taught to blind and visually impaired students. Nothing in current existing core curriculum addresses this critical need in a satisfactory manner. Thus, instruction in social interaction skills has become a part of expanded core curriculum as a need so fundamental that it can often mean the difference between social isolation and a satisfying and fulfilling life as an adult.

- **Independent Living Skills**

This area of expanded core curriculum is often referred to as "daily living skills." It consists of all the tasks and functions persons perform, in accordance with their abilities, in order to lead lives as independent as possible. These curricular needs are varied, as they include skills in personal hygiene, food preparation, money management, time monitoring, organization, etc. Some independent living skills are addressed in existing core curriculum, but they are often introduced as splinter skills, appearing in learning material, disappearing, and then re-appearing. This approach does not adequately prepare blind and visually impaired students for adult life. Traditional classes in home economics and family life are not enough to meet the learning needs of most visually impaired students, since they assume a basic level of knowledge acquired incidentally through vision. The skills and knowledge that sighted students acquire by casually and incidentally observing, interacting with, and responding to their environment are often difficult, if not impossible, for blind and visually impaired students to learn without direct, sequential instruction by knowledgeable persons.

- **Recreation and Leisure Skills**

Skills in recreation and leisure are seldom offered as a part of existing core curriculum. Rather, physical education in the form of team games and athletics are the usual way in which physical fitness needs are met for sighted students. Many of the activities in physical education are excellent and appropriate for visually impaired students. However, in addition these students need to develop activities in recreation and leisure that they can enjoy throughout their adult lives. Most often sighted persons select their recreation and leisure activity repertoire by visually observing activities and choosing those in which they wish to participate. The teaching of recreation and leisure skills to blind and visually impaired students must be planned and deliberately taught, and should focus on the development of lifelong skills.

- **Career Education**

There is a need for general vocational education as offered in the traditional core curriculum as well as the need for career education offered specifically for blind and visually impaired students. Many of the skills and knowledge offered to all students through vocational education can be of value to blind and visually impaired students. They will not be sufficient, however, to prepare such students for adult life since such instruction assumes a basic knowledge of the world of work based on prior visual experiences. Career education in an expanded core curriculum will provide the visually impaired learner of any age with an opportunity to learn first-hand (for example, the work done by a bank teller, a gardener, a social worker, an artist, etc.). It will provide students with opportunities to explore strengths and interests in a systematic, well-planned manner. Once more, a disadvantage facing the visually impaired learner is a lack of information about work and jobs that the sighted student acquires by observation. Because unemployment and underemployment have been a leading problem facing adult visually impaired persons in the United States, this portion of an expanded core curriculum is vital to students and should be part of an expanded curriculum for even the youngest of these individuals.

- **Technology**

Technology is a tool to unlock learning and expand the horizons of students; it is not, in reality, a curriculum area. However, it is added to the expanded core curriculum here because technology occupies a special place in the education of blind and visually impaired students. Technology can be a great equalizer. For the Braille user, it allows a student to provide feedback to teachers by first producing material in Braille for personal use, and then in print for teacher, classmates, and parents. It gives blind persons the capability of storing and retrieving information. It brings the gift of a library under the fingertips of a visually impaired person. Technology enhances communication and learning, as well as expands the world of blind and visually impaired persons in many significant ways. Thus, technology is a tool to master, and is essential to blind and visually impaired students as part of an expanded core curriculum.

- **Visual Efficiency Skills**

The visual acuity of children diagnosed as being visually impaired varies greatly. Through the use of thorough, systematic training, most students with remaining functional vision can be taught to better and more efficiently utilize their remaining vision. The responsibility for performing a functional vision assessment, planning appropriate learning activities for effective visual utilization, and instructing students in using their functional vision in effective and efficient ways is clearly an area for an expanded core curriculum. Educational responsibility for teaching visual efficiency skills falls to the professionally prepared teacher of visually impaired learners. Bringing together all of the skills learned in an expanded core curriculum produces a concept of the blind or visually impaired person in the community. It is difficult to imagine that a congenitally blind or visually impaired person could be entirely at ease and at home within the social, recreational, and vocational structure of the general community without mastering the elements of the expanded core curriculum. What is known about congenitally blind and visually impaired students is that, unless skills such as orientation and mobility, social interaction, and independent living are learned, these students are at high risk for lonely, isolated, unproductive lives. Accomplishments and joys such as shopping, dining, attending and participating in recreational activities are a right, not a privilege, for blind and visually impaired persons. Responsibilities such as banking, taking care of health needs, and using public and private services are part of a full life for all persons, including those who are blind or visually impaired. Adoption and implementation of a core curriculum for blind and visually impaired students, including those with additional disabilities, will assure students of the opportunity to function well and completely in the general community.

Appendix E: Six Core Principles

Principle 1. All students with disabilities must be included in a chosen assessment system.

Principle 2. Decisions about how students with disabilities participate in a chosen assessment system are the result of clearly articulated participation, accommodations, and alternate assessment decision-making processes.

Principle 3. All students with disabilities are included when student scores are publicly reported, in the same frequency and format as all other students, whether they participate with or without accommodations or by an alternate assessment.

Principle 4. Assessment performance of students with disabilities have the same impact on a final accountability index as the performance of other students, regardless of how students participate in a chosen assessment system (i.e., with or without accommodations or by an alternate assessment).

Principle 5. There is improvement of both a chosen assessment system and a chosen accountability system over time, through the processes of formal monitoring, ongoing evaluation, and systematic training in the context of emerging research and best practices.

Principle 6. Each policy and practice reflects the belief that all students must be included in state- and district-wide assessment and accountability systems.

Appendix F: Alaska's State Recommendations

Nine recommendations are made in regard to teachers and technology training in rural Alaskan school districts:

- Training should be provided within a curricular context with emphasis on integration of the application in an instructional format. Teachers will respond more to technology assistance that is directly related to something they are trying to achieve in the classroom (i.e., when technology use helps to solve an identified problem).

- Teachers who use technology should be supported by the provision of training or mentoring to more effectively link the software they are currently using or to expand their use of technology across the curriculum. Training for this group of teachers should be structured according to their individual immediate and future technological needs.

- Teachers should receive training or mentoring pertaining to the existence and use of Internet sites. Training may need to be coupled with improved Internet access, given that the present study shows that hardware considerations have some impact on the widespread desire to use the Internet.

- Older teachers should be encouraged to share their expertise and experience in the use of technology in instructional curriculum-related formats.

- Multimedia curriculum-related instructional presentations should be modeled to teachers during in-service training or mentoring sessions. Teachers' individual lesson plans should be used as content for multimedia presentations, with a focus on appropriate software.

- Teachers should receive specific training in and exposure to technologies relevant to the Deaf, for example, captioners, TTDs, web sites, videotapes, computer programs, and interactive networks. The enhanced visual presentations would have direct instructional value for deaf and hard of hearing students. In addition, general instructional strategies that teachers are currently using with deaf and hard of hearing students would be expanded upon.

- Teachers should be actively involved, as classroom and subject teachers, in the acquisition of software for school use.

- Teachers' schedules should include technology planning time. Teachers need the time to prepare, research, and share resources.

- When hiring, school systems should look for technology-literate teachers.

Appendix G: Six Guidelines for Inclusive Programs

1. Parental involvement is an essential component of effective inclusive schooling. From a variety of participant perspectives and methods, the active involvement of committed parents emerges repeatedly, whether the report is directly about parent perceptions (e.g., Erwin & Soodak, 1995; Ryndak, et al., 1995) or parents are identified by others as key participants (e.g., Staub et al., 1994; York-Barr, et al., 1996).

2. Students with severe disabilities can achieve positive academic and learning outcomes in inclusive settings. Studies on parental perception (Ryndak, et al., 1995) and general education teacher perceptions (Giangreco & Dennis, et al., 1993), as well as empirical documentation through experimental investigation (Hunt & Staub, et al., 1994), suggest that students with severe disabilities are able to learn new skills in regular classrooms.

3. Students with severe disabilities realize acceptance, interactions, and friendships in inclusive settings. Parents report acceptance and belonging as a major positive inclusion outcome (Erwin & Soodak, 1995; Ryndak, et al., 1995). Further, there is evidence that more opportunities for interaction occur through IEPs written for students in inclusive classrooms (Hunt & Farron-Davis, et al.,1994), that more reciprocal interactions among students with and without disabilities and larger friendship networks can occur in inclusive settings (Fryxell & Kennedy, 1995; Hunt & Alwell, et al., 1996) and that meaningful friendships occur for students with and without disabilities in inclusive classrooms (Staub, et al., 1994).

4. Students without disabilities experience positive outcomes when students with severe disabilities are their classmates. Positive outcomes have been perceived by parents of non-disabled students (Giangreco & Edelman, et al., 1993) and reflected in reports of no differences in educational achievement measures for peers who had a classmate with a disability and those who did not (Sharpe, et al., 1994), as well as in reports of no differences in time engaged in instruction for groups of students with and without a classmate having a severe disability (Hollowood, et al., 1994).

5. Collaborative efforts among school personnel are essential to achieving successful inclusive schools. Multiple investigators working with differing participant groups ranging from parents to classroom personnel to systems-level personnel addressed the role of collaborative team practice in achieving effective inclusion outcomes for students at systems, building, and classroom levels (Giangreco & Dennis, et al., 1993; Salisbury, et al., 1993; York-Barr, et al., 1996).

6. Curricular adaptations are a vital component in effective inclusion efforts. Curricular adaptations have been recognized by participants in a building-wide inclusive schooling effort (Salisbury, et al., 1993), by general educators reporting their own "transformational" experiences in inclusive classrooms (Giangreco & Dennis, et al., 1993), and by investigators designing an effective social support package for students with disabilities to be implemented by the general education classroom staff (Hunt, et al., 1996).

Appendix H: Alternate Assessment Approaches

Portfolio	A portfolio is a collection of student work gathered to demonstrate student performance on specific skills and knowledge, generally linked to state content standards. Portfolio contents are individualized, and may include wide-ranging samples of student learning, including but not limited to actual student work, observations recorded by multiple persons on multiple occasions, test results, record reviews, or even video or audio records of student performance.
IEP-Linked Body of Evidence	An IEP-linked body of evidence is a collection of student work demonstrating student achievement on standards-based IEP goals and objectives, measured against pre-determined scoring criteria. This approach is similar to a portfolio assessment, but may contain more focused or fewer pieces of evidence, with IEP documentation available to support scoring processes. This evidence may meet dual purposes of documentation of IEP progress and of assessment.
Performance Assessment	A performance assessment is a direct measure of student skills or knowledge, usually in a one-on-one assessment. These can be highly structured, requiring a teacher or test administrator to give students specific items or tasks, similar to pencil-and-paper traditional tests, or it can be a more flexible item or task that can be adjusted based on student needs.
Checklist	A checklist is a list of skills, reviewed by persons familiar with a student who observe or recall whether students are able to perform the skills listed, and to what level of proficiency.
Traditional (pencil-and-paper or computer-based) test	A traditional test is a set of constructed items requiring student responses, typically with correct and incorrect forced-choice answer format. These can be completed independently by groups of students with teacher supervision, or they can be administered in one-on-one assessments with a teacher recording answers.

Appendix I: Five Best-Practice Steps for States

1. ***Careful stakeholder and policy maker development of desired student outcomes for the population, reflecting the best understanding of research and practice.*** Having clearly defined student outcomes is necessary to the creation of an appropriate assessment system. These outcomes must communicate clear connections to state standards. In order to make this possible for significantly disabled students, different states have modified their content standards so that these standards are achievable by students with disabilities. Educators work these standards into the scoring systems that are used in the alternate assessments.

2. ***Careful development, testing, and refinement of assessment methods.*** It is important to create alternate assessments that provide "high quality evidence" of student achievement. However, this process is sometimes lengthy and requires that pilots of various assessments be done so that the most appropriate assessments are used. In addition, proper training and support for teachers and other educational professionals who administer these alternate assessments is needed.

3. ***Scoring of evidence according to professionally accepted standards.*** In order to be able to track the progress of significantly disabled students accurately, states need to set thorough guidelines on how the results of alternate assessments should be scored. In order for this to be achieved, training for scorers must be provided, scorers need to meet competency standards for scoring the assessments, and reexamination of the consistency and competency of scorers throughout the scoring process must be administered. In addition to this, Quenemoen, Rigney, and Thurlow (2002) cite that states must also engage in dual scoring and third party tie breakers to ensure the accuracy of the scores given.

4. ***Standard-setting process to allow use of results in reporting and accountability systems.*** After scores are determined, the work of the students is then reexamined so "bands" of cut scores across achievement descriptors can be identified by a panel of education and assessment professionals.

5. ***Continuous improvement of the assessment process.*** In order to achieve a successful assessment process, states must continually revise rubrics, edit achievement descriptors, and focus on the training of teachers to implement the alternate assessment process. In addition to that, increased amounts of research has resulted in increased test reliability, test validity, and connection between improving alternate assessment scores and improvements in instruction.