

TECHNOLOGY



Providing New Access to the General Curriculum

Universal Design for Learning

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What does it mean for special education students to have access to the general curriculum—especially those who have formerly been limited to special education curriculums? How can students effectively participate and make progress in the general curriculum? What new tools, methods, and approaches are needed—and are being implemented?

In our view, the answers to these questions depend on changes that we must make in the general curriculum to provide such access and participation. In so doing, we will create a curriculum that is better not just for students with disabilities but for all students.

This article examines what we mean by *access*, *participation*, and *progress* in the general education curriculum and suggests a new framework for curriculum reform that holds promise for students with disabilities, in particular, and raises countless possibilities for all students. The article presents the Universal Design for Learning (UDL) as

a framework for curriculum reform that takes advantage of new media and new technologies for learning (Hitchcock, Meyer, Rose & Jackson, 2002; Rose & Meyer, 2002; see box, “UDL Curriculum in a Nutshell”).

What’s Going On Now: Retrofitting the “Core” General Curriculum

As many educators have stated, if a person from the 1800s were to observe our culture now, the only thing that would look the same would be the schools (Pearlman, 1992). In contrast, were a teacher or parent of a student with a disability from 1970 able to view the current status of education for students with disabilities, he or she would be amazed at how far we have come. We now know a great deal about these students and the approaches, tools, and contexts that help them learn. Policy changes have brought unprecedented opportunities (see box, “IDEA and the General Curriculum”), and schools and districts are continually developing innovative ideas and approaches. Yet we still find flaws and shortcomings in the overall approach to educating students with disabilities.

What Is a Core Group?

States and districts are still designing the general curriculum to serve a core group of students, exclusive of students with disabilities. Even when

UDL Curriculum in a Nutshell

In a UDL curriculum . . .

- *Goals* provide an appropriate challenge for all students.
- *Materials* have a flexible format, supporting transformation between media and multiple representations of content to support all students’ learning.
- *Methods* are flexible and diverse enough to provide appropriate learning experiences, challenges, and supports for all students.
- *Assessment* is sufficiently flexible to provide accurate, ongoing information that helps teachers adjust instruction and maximize learning.

publishers explicitly include techniques for diverse learners, the writers seem to consider those diverse learners as outliers and exceptions. These exceptions include not only students with disabilities but also students with exceptional talents, those whose native language is not English, and many others.

Is There Such a Thing as a Homogeneous Classroom?

The assumption that there *is* a “core” group of learners that is mostly homogeneous, outside of which other learners fall, is itself flawed. Common sense, and increasingly neuroscience,

IDEA '97, with its requirement of general curricular access and mandated participation in state accountability systems, presents great challenges to special education.

Curriculum matters and “fixing” the one-size-fits-all, inflexible curriculum will occupy both special and general educators well into the future.

tells us that learners considered to be within a group are at least as diverse along various dimensions affecting learning as are learners considered to be in different groups (Rose & Meyer, 2002). In fact, we know that myriad subtle differences make each learner unique.

The post hoc retrofitted solutions that spring from the assumption of homogeneity consume much time and money, with only modest effectiveness. These drawbacks stem from the mistaken view that students with diverse learning needs are “the problem” (King-Sears, 1997), when in fact barriers in the curriculum itself are, in our view, the root of the difficulty (Jackson, Harper & Jackson, 2001).

What Have We Learned From Mainstreaming and Inclusion—and Curb Cuts?

The insights gained from the mainstreaming and inclusive schools movement have been crucial steps along the way to a new, more flexible curriculum—the universally designed curriculum. The idea of creating a flexible environment that serves a broad range of consumers originated with universal design in architecture. Retrofitting buildings with added-on ramps and automatic doors to accommodate people with disabilities is costly, marginally effective, and often esthetically disastrous. Architects have learned that designing buildings with the needs of diverse users in mind from the beginning saves costs and leads to more streamlined, accessible buildings, in which alternatives are integral to the design. And as it turns out, universal design works better for everyone.

The curb cut is the classically cited example. Engineers originally designed the curb cut to better enable those in wheelchairs to negotiate curbs, but they

also ease travel for people pushing strollers or riding skateboards, pedestrians with canes, and even the average walker. Commercial product designers also practice universal design, with similar results. Consider television captioning. When these captions first appeared, individuals who were deaf had to purchase expensive decoder boxes, retrofitting their televisions so that they could access the captions. Later, decoder chips were built into every television, making captions available to all viewers. This universal design feature now benefits not only those who are deaf but also exercisers in health clubs, diners in noisy restaurants, people working on their language skills, and couples who go to sleep at different times. Furthermore, as a built-in feature, access to television captioning costs a few cents rather than several hundred dollars (Rose & Meyer, 2002, p. 71).

What Is a Universally Designed Curriculum?

In the early 1990s, the Center for Applied Special Technology (CAST) began to apply the concept of universal design to curriculum materials and methods and coined the term “Universal Design for Learning” or “UDL.” The UDL framework helps us to see that inflexible curricular materials and methods are barriers to diverse learners just as inflexible buildings with stairs as the only entry option are barriers to people with physical disabilities. If curriculum designers recognize the widely diverse learners in current classrooms and build in options to support learning differences from the beginning, the curriculum as inherently designed can work for all learners. In addition, the need to modify, create alternative versions, and employ assistive technologies is greatly diminished (although technologies will always play a crucial role for some stu-

Students with diverse learning needs are not “the problem”; barriers in the curriculum itself are the root of the difficulty.

Widely Diverse Curriculum for Widely Diverse Students

How can we create a curriculum in which the *goals, materials, methods, and assessments* serve widely diverse learners? To meet that goal, teachers need to offer a large number of alternative ways to access, use, and engage with learning content. In a print-based environment, where there is one “primary” version and others are all alternatives, offering such variety is impractical.

Fortunately, digital media and computer technologies make it possible to offer a curriculum that is created once but can be displayed and used in an almost limitless variety of ways. With the power of digital technologies, it is possible to provide a malleable curriculum in which content and activities can be presented in multiple ways and transformed to suit different learners.

Thus, with digital content, we can provide multiple representations (e.g., image, text, and video), transform one medium to another (e.g., text-to-speech or speech-to-text), or modify the characteristics of a presentation (e.g., size and color of text, loudness of sound; Hitchcock, 2001; Rose & Meyer, 2002).

Universally designed curriculums include a range of options for accessing, using, and engaging with learning materials—recognizing that no single option will work for all students (Rose & Meyer, 2002). UDL shifts the burden for reducing obstacles in the curriculum away from special educators and the students themselves and leads to the development of a flexible curriculum that can support all learners more effectively.

Building a curriculum with inherent flexibility (see box, “Widely Diverse Curriculum”) helps teachers maintain educational integrity and maximize consistency of instructional goals and methods, *while still individualizing learning*. To see how such a universally designed curriculum might work, we highlight key features of UDL goals, materials, methods, and assessments, as derived from CAST’s research and development (Hitchcock, 2001; Rose & Meyer, 2002).

Recently, a number of authors have shifted special educators' attention to the importance of curriculum and standards-based reform for students with disabilities (Nolet & McLaughlin, 2000; Pugach & Warger, 2001; Wehmeyer, Sands, Knowlton, & Kozleski, 2002). The landmark Individuals with Disabilities Education Act Amendments of 1997 (IDEA '97) stipulate that students with disabilities are entitled to access, participation, and progress within the general education curriculum (Yell & Shriner, 1997). This language offers greater potential educational opportunities for students with disabilities than they have ever before enjoyed (Heumann & Hehir, 1997).

What Is the General Curriculum?

The "general curriculum" is the overall plan for instruction adopted by a school or school system. Its purpose is to guide instructional activities and provide consistency of expectations, content, methods, and outcomes. Curricula usually include an assortment of content materials for student use, teacher's guides, assessments, workbooks, and ancillary media. In our work on Universal Design for Learning (Rose & Meyer, 2002), we define 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 (4) means of assessment to measure student progress.

What Is the Influence of the Standards Movement?

The design and implementation of the general education curriculum is increasingly driven by external standards that are adopted from statewide or national school reform initiatives (Nolet & McLaughlin, 2000). Developed by national, state, and local curriculum writing groups and by subject area experts, standards aim to articulate clearly the knowledge, skills, and understandings all students should gain in a particular subject, with more specific

IDEA and the General Curriculum

benchmarks of achievement by grade level. Standards articulate what schools value and, therefore, what teachers teach and assess.

What Does IDEA Say?

Under IDEA, students with disabilities are entitled to "access," "participation," and "progress" in the general curriculum. They are to aspire to the same standards and expectations as their peers (Pugach & Warger, 2001). This means that all four components of curriculum—goals, media and materials, teaching methods, and assessment—need to apply to all students.

Because the "general curriculum" itself evolves, and because legislation has dramatically advanced opportunities for students with disabilities, the terms "access, participation, and progress" have not always meant the same thing. The challenge for educators of students with disabilities is a moving target—and fortunately so; the changing nature of the barriers reflects progress towards true access, participation, and progress.

Before IDEA, the "access" hurdle was about legal access to an education and physical access to buildings and classrooms. Children with disabilities were once denied a public education unless they could demonstrate a capacity to benefit from it (Lippman & Goldberg, 1973). Such denial amounted to a tacit recognition of the general curriculum as fixed and something that students had to be ready and able to receive. Legal access to education for students with disabilities did not exist until Congress passed the landmark Education for All Handicapped Children Act (EAHCA) in 1975. This law, renamed IDEA through reauthorization in 1990, mandated an education individually tailored to meet unique needs arising from or associated with disability. No child with a disability could be denied a special education. The individualized education program (IEP) ensured due process and accountability (Yell, 1998).

The "special" curriculum arose in response to the mandate of EAHCA to provide students with disabilities a free

and appropriate public education in the least restrictive environment. This curriculum was a critical step forward in special education because of the resulting deeper understanding of the particular needs of different students and the important, innovative materials and methods that were developed and tailored to individuals (Benner, 1998). Into the 1980s, special education expanded and emerged as a system within a system of public education.

As barriers to an education were reduced for students with disabilities, new ones came into view. The key problem with the special curriculum is its separateness from the general curriculum. The notion that separate schooling helps students "catch up" or "be fixed" and then return to the general setting is flawed on the face of it. In fact, research evidence shows that for most students a separate, special education did not realize its promise to help them catch up or reunite with their peers and function well in general education settings (Carlberg & Kavale, 1980; Junkala & Mooney, 1986).

Many grew dissatisfied with the dual worlds of special and general education, calling for a "general education initiative" to meet the needs of all learners including those with disabilities (Lipsky & Gartner, 1989; Will, 1986). Increasingly, students with disabilities found themselves in general classroom settings. Although IDEA today retains the requirement that school districts identify a continuum of placement options to meet the individual needs of students (Turnbull & Turnbull, 1998), case law increasingly supports inclusion under the presumption that students with disabilities will attend the same school that they would were they not disabled (Osborne & DiMattia, 1994). Consequently, special education has evolved from the notion of a "place" for isolation and containment to a system of services and supports for students with disabilities in the broader context of school and community (Heumann & Hehir, 1997), thereby supporting integration through progressive mainstreaming or full inclusion.

IDEA and the General Curriculum, (Continued)

How Did Access Become a Civil Rights Issue?

During the same period, excluding students with disabilities from an opportunity to derive comparable benefit from education reform became a civil rights issue. Educational reform—triggered by concern over our nation’s capacity to compete in an increasingly global economy—began to focus on the curriculum and its capacity to raise standards and improve results as measured by broad scale assessment systems. Federal initiatives to help states set standards and measure their attainment meant opportunity to improve results for all students. Section 504 of the Vocational Rehabilitation Act of 1973 (DeBettencourt, 2002) was invoked as a tool to compel school districts to include students with disabilities in the general classroom setting (Yell & Katsiyannis, 2001).

Once in the same classroom as their peers, students with disabilities faced a curriculum filled with barriers, a curriculum that for many was unusable. The general curriculum today is largely inflexible, because the printed textbook remains at its core. The medium of print has long dominated communication and, therefore, education and curriculum design. Once material is committed to paper, it can-

not be adjusted and changed: The text is one size and available only to those who can handle the physical book, see and decode the text, and understand the concepts necessary to interpret it.

Because printed text has been the standard and viewed as the only viable way to convey information, teaching and learning have been configured to accommodate this medium, and approaches to teaching students with disabilities have proceeded with printed text as a given. Consequently, students who for varied reasons are not able to learn effectively from printed texts have been unable to truly “access, participate, and progress in the general curriculum.”

Thus, equal protection of the rights of students with disabilities cannot be guaranteed by merely physically placing students in a classroom setting alongside age mates without disabilities. Because the general curriculum does not consider the diverse needs of students with disabilities in its original design, adaptations, modifications, and assistive technologies proliferate to support these learners’ progress. Although the concept that the curriculum itself might need to be modified has moved thinking forward, retrofitting an inherently unsuitable curriculum to fit diverse learners still con-

veys the message that there is a “more correct” or “more appropriate” way to do things and lesser or “other” options, which are needed for particular learners. A curriculum that is designed to be accessible and supportive from the start will improve learning opportunities and reduce the stigma of special education. Further, it should reduce the need for special education.

Can the New IDEA ‘97 Help?

IDEA ‘97, with its requirement of general curricular access and mandated participation in state accountability systems, presents great challenges to special education (Thurlow, 2000). From the initial enactment of IDEA, special education was devoted to “fixing” the student through remedial skills training or—when this was not deemed feasible—compensating for the child’s disability by teaching functional or adaptive skills. Educators paid very little attention to curriculum for students with disabilities (Meyen, 1996). The separation of special education perpetuated the misguided assumption that the general curriculum in its inflexible form was a given. Today, curriculum matters (Pugach & Warger, 2001), and “fixing” the one-size-fits-all, inflexible curriculum will occupy both special and general educators well into the future.

Goals

In a UDL curriculum, goals provide an appropriate challenge for all students. UDL goals begin with standards and benchmarks that reflect the knowledge and skills all students will strive for and are carefully conceived and expressed to encourage multiple pathways for achieving them.

Understanding and Stating Goals Broadly. To develop a UDL goal, teachers must first thoroughly understand what they want students to learn. This sounds simple and obvious, but it is not a given. Many times the language of the goal incorporates a specific means for achievement when that means is not, in fact, what the student needs to learn. In such cases the goals inadvertently spec-

ify one acceptable path. You can make almost any goal inaccessible by unnecessarily limiting the means for reaching it. And conversely, students can achieve most goals if you provide flexibility in the means of achieving the goals. Human flight is a good example. The goal of human flight is unreachable if the means are limited (e.g., “Students will fly using their arms as wings”), but quite attainable if more alternatives are included (“Students will fly”).

Similarly, if you state a goal for *composition* narrowly (“Handwrite a 300-word essay about the challenges faced by Lewis and Clark”), then you may exclude students with motor disabilities and learning disabilities or place them at severe disadvantage. The same goal stated more broadly (“Generate a 300-

word essay. . . .”) allows students with many disabilities to participate and make progress by using word processors, spell checkers, voice recognition software, and other scaffolds and supports. This rewording reflects a clearer focus on the purpose of the essay, which is to gather, synthesize, and express certain historical information, *not* to demonstrate penmanship.

Finding the Means for Students to Reach Goals. Once you understand the true purpose for learning, you can use various means, media, scaffolds, and supports to help students reach the goal without undermining the challenge and the learning. For example, if the goal is for students to understand a mathematical or scientific relationship, students could reasonably employ a variety of

If curriculum designers recognize the widely diverse learners in current classrooms and build in options to support learning differences from the beginning, the curriculum as inherently designed can work for all learners.

media and approaches for gathering and keeping track of information and expressing knowledge. Graphics and video, or digital text with reading supports, could provide some appropriate routes to achieving this goal.

Eliminating Inappropriate and Unnecessary Adaptations. Clear goals also reduce problems likely to arise from inappropriate accommodations and adaptations. If the goal were clearly focused on learning to decode words, then many kinds of reading supports or accommodations that would be appropriate in a history lesson would eliminate the challenge and the opportunity for learning to decode. Clear goals enable us to know when alternative methods and materials are *not* appropriate for reaching those goals.

Well-conceived and carefully expressed goals are the foundation of a curriculum in which all students can participate and make progress.

Materials

In a UDL curriculum, teachers provide materials in a flexible format, supporting transformation between media and multiple representations of content to support all students' learning.

Multiple Media. The critical content at the center of a curriculum, the facts, concepts, information, principles, and relationships that are to be learned, must be rendered in some medium. What medium is best? No single medium (e.g., text, voice, images) is accessible to all students. The UDL curriculum offers built-in "alternate" or "multiple" representations.

Print Alternatives. With printed books, the content and its display are inextricably linked; the ink of the text or image is

embedded in the page. With digital media, the content can be separated from its display. Thus, the content can be provided once and displayed in a variety of ways. For example, text can be displayed at any size on a screen or in print, as speech, in the context of a concept map, or as Braille (either printed or on a refreshable Braille device), among others. An image can be presented in print or on-screen at any size and with colors modified to increase visibility, as a text or spoken description, or as a summary of the image's importance and implications for the context in which it is found. Further, this same content can potentially be displayed on various electronic devices such as hand-held computers or even telephones.

Benefits of Flexibility. This adaptability increases accessibility for students with visual, auditory, reading, or motor impairments because they can elect to view and respond to the content in a medium and means that suit their needs. Students may choose the medium or media most effective for them, as long as the learning goal is not undermined.

Digital content makes possible another important kind of flexibility, the flexibility to embed supports and links. Not only can you display digital content in different ways, you can provide optional "smart supports" that individual students can use as needed. Thus digital documents can include

- Hyperlinks to glossaries.
- Related background information in multiple media.
- Graphics and animations to summarize or highlight key relationships.
- Queries to support strategic thinking.
- Sequenced supports for stepwise processes.
- Tools for expression and organization, such as a notepad with capacity to store text, recorded voice, and images; or a Q&A tool to ask questions of teachers or peers online.

Digital materials for expression are also far more flexible than are their print-based cousins. The power of word processing is by now widely known and used, with its ease of editing and multiple writing tools such as thesauri, spelling and grammar checkers, and dictionaries. Tools to track changes and

identify the authors of changes, insert annotations, and merge documents elegantly support collaborative composition. Voice recognition software enables students who type with difficulty or not at all to compose in text. Multimedia tools such as HyperStudio and ClarisWorks offer diverse learners alternatives to composing in straight text, including creating an entire communication using images and sound or recorded voice, or alternately, beginning with images or sound and moving to text once the key ideas are laid out.

Within a UDL curriculum these alternatives are all viable means of expression. Flexible materials fulfill the promise of UDL in that they open doors and circumvent barriers for students with disabilities and also improve learning opportunities for all students—in the same way that universally designed buildings and technologies benefit "mainstream" users. As long as you keep the learning goal in mind and ensure that all students are challenged to do their best, the curriculum should offer rich scaffolds, supports, and alternative ways of obtaining information and expressing ideas. Through these alternatives, all students benefit.

Methods

In a UDL curriculum, methods are flexible and diverse enough to provide appropriate learning experiences, challenges, and supports for all students.

Pedagogy Matters. Good pedagogy is at the core of a good curriculum. The value of instructional design is in elevating the probability that any one child, and every single child, will learn what is critical to the curriculum. Rather than offering content unsupported and leaving students' success to happenstance, privilege, or random discovery, we teach what is important, and we teach it by adopting the most effective methods so that all children will learn.

In a diverse classroom, no single method can reach all learners. Multiple pathways to achieving goals are needed. In a UDL classroom, you can support those multiple pathways by presenting concepts in multiple ways, offering students multiple means of expressing their knowledge, and providing a variety of

options to support each student's engagement with learning. When you practice UDL, you assume that each student needs his or her own "size" and provide options, scaffolds, and further opportunities for in-depth learning as a matter of course. In the examples that follow, we illustrate what *could* be real, given technologies that exist today, though of course UDL is not yet fully implemented by publishers or by educators.

Benefits of Flexible Pedagogy. Using a UDL approach to presenting concepts, we can offer multiple examples and highlight the critical features that differentiate that concept from others. In a UDL classroom, we also assume that students bring varied amounts of background knowledge to a particular concept and offer optional additional background information for those who may lack prerequisite knowledge. Digital technologies could substantially ease this process (see box, "Mathematics Example").

When supporting strategic learning, you can use a UDL approach to offer

- Models of skilled performance.
- Plentiful chances for students to practice with appropriate supports and ongoing feedback.
- Opportunities to demonstrate skills in a meaningful social context.

We need to provide these models and supports in many ways to meet *all* students' needs (see box, "U.S. History Example"). When we use a UDL approach, we can actually respond to our recognition that each student will engage with learning for different reasons and in different ways. To support these differences, we offer students choices of content and media or tools to work with as long as the learning goal is not compromised. To stay interested and committed to the task at hand, stu-

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Mathematics Example

Suppose a math teacher uses the UDL approach to convey the critical features of a right triangle. With software that supports graphics and hyperlinks, he prepares a document that shows

- Multiple examples of right triangles in different orientations and sizes with the right angle and the three points highlighted.
- An animation of the right triangle morphing into an isosceles triangle or into a rectangle, with voice and on-screen text to highlight the differences.
- Links to reviews on the characteristics of triangles and of right angles.
- Links to examples of right triangles in various real-world contexts.
- Links to pages that students can go to on their own for review or enrichment on the subject.

The teacher could then project the document onto a large screen in front of the class. Thus, he would present the concept not simply by explaining it verbally or by assigning a textbook chapter or workbook page, but by using many modalities and with options for extra support or extra enrichment.

dents also need an appropriate balance of challenge and support. Vygotsky describes the ideal balance point as where the goal is just beyond reach but achievable with effort, what he calls the "zone of proximal development (ZPD)" (Vygotsky, 1978). Of course, the ZPD is different for different students, and teachers can lower the bar without compromising the goal by supporting students in areas of need that are not germane to the challenge at hand. Optional scaffolds might include

- Offering concept maps highlighting main points and supporting details.
- Showing relationships between events or parts of a complex concept.
- Stepping learners through an inquiry process.

Tools that help students organize their work such as templates (visual or textual), highlighting tools that enable students to code and collect content by

categories, and many others, can support organizational or motor difficulties. **Remembering Motivation.** You can also adjust the learning context to emphasize collaboration, rather than competition, as in cooperative learning (Johnson & Johnson, 1986, 1989; Slavin, Madden, & Leavy, 1984). Offering such varied options supports the motivational and emotional involvement of varied learners in a UDL classroom.

Assessment

In a UDL curriculum, assessment is sufficiently flexible to provide accurate, ongoing information that helps teachers adjust instruction and maximize learning.

Individual Progress. Effective teaching requires accurate knowledge of progress. To obtain this knowledge, we must separate the skill required to use specific media, such as printed text, from the skill or knowledge being assessed. A test

U.S. History Example

A U.S. history teacher using the UDL approach might ask her students to construct an essay that compares and contrasts the industrial North with the agricultural South in the 1800s. Her focus is the thinking behind the essay, the method of comparing and contrasting, as a means to help her students gain deeper understanding of the period and the geographical locations.

She emphasizes that there are many different approaches to constructing the essay and offers examples: outlines, diagrams, concept maps, digitally recorded "think alouds," and drawings. She uses tools that support each of these approaches, so that students who need extra structure can choose the supports that work for them, and she creates templates with partially filled in sections and links to more information.

Because this is a long-term assignment, the teacher breaks the research and the writing into pieces and builds in group sharing and feedback to help students revise as they work. The teacher also provides models of the process by sharing the work of previous students who approached the problem in varied ways.

Resources

National Center for Accessing the General Curriculum (NCAC)—
<http://www.cast.org/ncac>

CAST established NCAC in 1999 through a cooperative agreement with the U.S. Department of Education's Office of Special Education Programs, as part of a national initiative that emerged from IDEA '97. The National Center draws on the talents of five partners who are already established leaders in their fields to provide leadership in using the UDL framework to increase access to the general education curriculum for all learners. NCAC is investigating and making recommendations in 4 major areas: policy and legal issues, curriculum design, teacher preparation and training, and building consensus among varied stakeholders.

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CAST—<http://www.cast.org>

Founded in 1984 as the Center for Applied Special Technology, CAST is a not-for-profit organization that uses technology to expand learning opportunities for all people, especially those with disabilities. Visit the CAST Web site to learn more about CAST's work and Universal Design for Learning.

Teaching Every Student: TES Web Site—<http://www.cast.org/tes>

The Teaching Every Student (TES) Web site is an interactive learning environment that explains and exemplifies CAST's concept of Universal Design for Learning (UDL), and forms a bridge between UDL theory and classroom practice. Through TES

- Gain a thorough understanding of what UDL is all about: its roots in brain, media, technology, and educational research; the nature of the theory itself; and how UDL can help reach diverse learners by setting goals carefully, supporting varied paths to learning, and assessing students fairly.
- Find tutorials, tools, activities and scaffolds to help apply UDL in the classroom.
- Connect with CAST researchers, colleagues, and others interested in using UDL to reach and teach all learners.

given in a single medium inevitably tests mastery of that medium, "Traditional assessments tend to measure things that teachers are not trying to measure (visual acuity, decoding ability, typing or writing ability, motivation) making it impossible to disaggregate the causes of success or failure (Rose & Meyer, 2002)." For students with disabilities who may have difficulty with a particular medium, the test poses insurmountable barriers that have nothing to do with the actual skill or knowledge that is supposedly being evaluated.

Goals Again, and Always. Like UDL teaching, UDL assessment requires a clear understanding of the learning goal. With that understanding, teachers can provide scaffolds during an evaluation to help students overcome media-

related barriers and show what they really know. Even better, evaluation should be embedded in the materials with which students are working, so that ongoing monitoring and feedback can help them stay on track (see box, "Assessment Example").

Access, Participation, and Progress in the Universally Designed Curriculum

When implemented, the UDL curriculum will be ideally suited to supporting true access, participation, and progress in the general curriculum for students with disabilities, and indeed, to improving learning opportunities for all students. With the premise that each student can benefit from a flexible curriculum offering clear goals, multiple path-

Assessment Example in Reading

CAST's "Thinking Reader," being developed as part of the "Engaging the Text: Reciprocal Teaching and Questioning Strategies in a Scaffolded Learning Environment" project funded by the U.S. Office of Special Education Programs (OSEP), offers an early example of embedded assessment. *Thinking Reader* is a Web-based "supportive reading environment" that embeds strategy supports into digital versions of award-winning children's literature (Dalton, Pisha, Coyne, Eagleton, & Deysner, 2001).

Students respond to prompts embedded in the text that support strategic thinking, and their responses are saved in a reading log that can be viewed and discussed by students and teachers. This kind of embedded assessment is integral to the learning task and provides the same supports that students need while learning. Thus, the focus of the assessment matches the focus of the instruction, and students do not face media related barriers. Though much more research is required, this direction is promising and the technology is here to make it possible.

ways for reaching those goals, and fair and accurate assessment, the UDL curriculum reflects an understanding that each learner is unique.

Access

Access in a UDL curriculum occurs at many levels. Most basically, because students with disabilities are considered from the outset, many barriers found in the mainstream curriculum are eliminated or very much reduced. By building in flexible options for teachers to convey concepts and for students to express their knowledge, the UDL curriculum increases access for everyone. Thus the goals, methods, materials, and assessments in a UDL curriculum are accessible to all.

Keeping the Plan in Mind. There is a tendency to equate access in a curriculum with access to information, or access to activities. But a curriculum is not information or activities, it is a plan for learning, and therefore the learning

Aesop's Fable Example

Suppose the teacher assigns a student to read an Aesop's fable. The purpose of this assignment determines the appropriate steps for making it accessible. The teacher will ask: Is the goal

- To learn to decode text?
- To learn comprehension strategies for extended passages?
- To build vocabulary?
- To learn the moral or point of the fable?
- To learn the common elements of any fable?

- To learn how to compare and contrast fables with news reports?
- To articulate the relationship between the fable and the overall culture?

The scaffolds and supports that might be appropriate depend entirely on the purpose of the assignment.

If, for example, the purpose of the fable assignment were to *become familiar with the elements commonly found in fables*, then supporting word decoding, vocabulary, and comprehension of the story itself would not interfere with the learning challenge. Supports such as text-to-speech, linked vocabulary, or animations illustrating interactions between characters would support different students but still leave the appropriate kind of challenge for all learners.

But if the goal were to *provide practice in decoding and reading fluency*, providing those same supports could undermine the learning challenge and actually impede access to learning. The reading support would eliminate the students' opportunity to practice and work towards reading independence.

has to be accessible. After all, the important thing is not whether a particular activity or piece of material (a textbook, a film, a software simulation) is accessible; the important thing is whether the learning for which the material or activity is designed is accessible. That is its purpose in a curriculum. Thus, access needs to be implemented in the context of learning goals (see box, "Aesop's Fable Example").

Keeping It Challenging. Because the alternatives offered in a UDL curriculum could

in theory "give away" the point of a lesson, the alternatives and options must be carefully embedded in learning goals in order to preserve true access to learning.

Participation

Participation in a UDL curriculum means true engagement with learning, in pursuit of the goal that is defined for the class as a whole. Clearly articulated goals, communicated and agreed to by students, are the bedrock of a functional UDL curriculum and a prerequisite for true participation.

Importance of Clear Goals. To build learners' awareness and commitment to their learning purposes, teachers in a UDL classroom make goals clear and help students keep them front and center when working in class or on homework assignments.

Learning How to Learn. More than simple content or skills learning, true participation involves "learning how to learn." The heavy emphasis on content learning observed in the mainstream curriculum is shifted towards the mastery of skills and strategies in a universally designed curriculum, "Learning how to plan, execute, and evaluate a range of tasks from forming single letters to writing a research paper, directing a video production, or creating a Web site...is highly critical to all aspects of learning" (Rose & Meyer, 2002). Skill development is embedded in all content learning activities to provide opportunities to "learn how to learn."

Using Varied Tools. With digital tools, supports for active learning can be built into curriculum materials themselves. In CAST's "Thinking Reader" (see box, "Assessment Example in Reading"), features like text-to-speech, leveled prompts and hints for various strategies that are introduced; and a selection of content, challenge, and support, help all learners become more strategic, self-aware, and engaged—critical components to participating in the curriculum.

Progress

Progress in a UDL curriculum is centered on curricular goals, not on overcoming curricular barriers. The distracting "proxies" for progress—changes in setting or place, increased participation

in activities, reduction of barriers, or success in utilizing accommodations and modifications—are no longer the central focus. Measures of progress for students with disabilities become the same measures as for other students: measures of learning.

Challenging Goals. This emphasis on the goals for learning is possible because the curriculum is designed to eliminate barriers to access and participation. But eliminating those barriers does not eliminate all effort or challenge in reaching goals, which most significant learning requires. On the contrary, UDL requires that the challenge and resistance essential to real learning be preserved, but properly focused (Rose & Meyer, 2002). The goal of universal design is not to reduce all effort, but to reduce extraneous effort—effort that is unrelated, distracting, disabling—because it is expended in overcoming barriers and poorly designed pedagogies. When goals do not needlessly restrict the pathways to success, all students make progress with them.

Allowable Scaffolds. For diverse students to work effectively towards a common goal, the goal must be clearly defined so that teachers can easily identify "allowable" scaffolds—those supports that do not interfere with learning, that preserve the challenge. In addition, assessment measures need to have the same scaffolds built into them that students use when working in class. Only then is the evaluation a fair and accurate assessment of what students know and can do in relation to that particular learning goal.

Final Thoughts

The National Center for Accessing the General Curriculum supports a new underlying assumption for curriculum design: "Each learner needs his or her own size." Although this may seem radical, this notion is old hat to clothing manufacturers, designers of car seats, and makers of fitness equipment.

Resting on this new assumption, UDL offers design principles, technology tools, and implementation strategies for creating one curriculum that is sufficiently flexible to reach all students. Clear goals, flexible methods and materials, and embedded assessments make

Flexible materials fulfill the promise of UDL in that they open doors and circumvent barriers for students with disabilities and also improve learning opportunities for all students.

it possible for students with disabilities to truly access, participate, and progress in the general curriculum.

References

- Benner, S. M. (1998). *Special education issues within the context of American society*. Belmont, CA: Wadsworth.
- Carlberg, C., & Kavale, K. A. (1980). The efficacy of special versus regular class placement for exceptional children: A meta-analysis. *The Journal of Special Education, 14*, 295-309.
- Dalton, B., Pisha, B., Coyne, P., Eagleton, M., & Deysher, S. (2001). *Engaging the text: Reciprocal teaching and questioning strategies in a scaffolded learning environment*. (OSEP Project # H324D 980051, December 1, 1998 to November 30, 2001. Final report to the U. S. Office of Special Education.) Peabody, MA: Center for Applied Special Technology.
- DeBettencourt, L. U. (2002). Understanding the differences between IDEA and section 504. *TEACHING Exceptional Children, 34*(3), 16-24.
- Heumann, J. E., & Hehir, T. (1997). Believing in children: A great IDEA for the future. *Exceptional Parent, 27*(9), 38-42.
- 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. (2002). *Access, participation, and progress in the general curriculum: A universal design for learning*. Retrieved April 12, 2002, from the NCAC Web site: <http://www.cast.org/ncac/techbrief>
- Jackson, R., Harper, K., & Jackson, J. (2001). *Effective teaching practices and the barriers limiting their use in accessing the curriculum: A review of recent literature*. Retrieved September 5, 2001, from CAST Web site: <http://www.cast.org/ncac/index.cfm?i=1942/>
- Johnson, D. W., & Johnson, R. T. (1986). Mainstreaming and cooperative learning strategies. *Exceptional Children, 52*, 553-561.
- Johnson, D. W., & Johnson, R. T. (1989). *Cooperation and competition: Theory and research*. Edina, MN: Interaction Book Company.
- Junkala, J., & Mooney, J. F. (1986). Special education students in regular classes: What happened to the pyramid? *Journal of Learning Disabilities, 19*(4), 218-221.
- King-Sears, M. E. (1997). Best academic practices for inclusive practices. *Focus on Exceptional Children, 29*, 1-21.
- Lippman, L., & Goldberg, I. I. (1973). *Right to education: Anatomy of the Pennsylvania Case*. New York: Teachers College Press.*
- Lipsky, D. K., & Gartner, A. (1989). *Beyond special education: Quality for all*. Baltimore, MD: Paul H. Brookes.*
- Meyen, E. J. (1996). *Exceptional children in today's schools* (3rd ed.). Denver, CO: Love.*
- Nolet, V., & McLaughlin, M. J. (2000). *Accessing the general curriculum: Including students with disabilities in standards-based reform*. Thousand Oaks, CA: Corwin Press.*
- Osborne, A. G., & DiMattia, P. (1994). The IDEA's least restrictive environment mandate: Legal implications. *Exceptional Children, 61*, 6-15.
- Pearlman, L. (1992). *School's out: Hyper learning, the new technology, and the end of education*. New York: William Morrow.

- Pugach, M. C., & Warger, C. L. (2001). Curriculum matters: Raising expectations for students with disabilities. *Remedial and Special Education*, 22(4), 194-198.
- 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.
- Slavin, R. E., Madden, N. A., & Leavy, M. (1984). Effects of team assisted individualization on the mathematics achievement of academically handicapped and non-handicapped students. *Journal of Educational Psychology*, 76, 813-819.
- Thurlow, M. L. (2000). Standards-based reform and students with disabilities: Reflections on a decade of change. *Focus on Exceptional Children*, 33(3), 1-16.
- Turnbull, H. R., & Turnbull, A. P. (1998). *Free appropriate public education* (5th ed.). Denver, CO: Love.*
- Vygotsky, L. S. (1978). Interaction between learning and development. In M. Cole, V. John-Steiner, S. Scribner, & E. Souberman (Eds.), *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- 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.*
- Will, M. C. (1986). Educating children with learning problems: A shared responsibility. *Exceptional Children*, 52, 111-145.
- Yell, M. L. (1998). *The law and special education*. Upper Saddle River, NJ: Merrill/Prentice Hall.
- Yell, M. L., & Katsiyannis, A. (2001). Promises and challenges in education law: 25 years of legal developments. *Preventing School Failure*, 45(2), 82-87.
- Yell, M., & Shriner, J. (1997). The IDEA amendments of 1997: Implications for special and general education teachers, administrators, and teacher trainers. *Focus on Exceptional Children*, 30(1), 1-19.
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