Universal Design for Learning

By Dave L. Edyburn

The origin of the term *Universal Design for Learning* (UDL) is generally attributed to David Rose, Anne Meyer, and colleagues at the Center for Applied Special Technology (CAST). The principles of UDL were developed following the 1997 reauthorization of the Individuals with Disabilities Education Act (IDEA). At that time there was considerable national interest in the issue of inclusion which placed the majority of students with disabilities in general education classrooms. While students with disabilities had gained physical access to the general education classroom, concerns were being raised about how students would gain "access to the general curriculum."

McLaughlin (1999) reported that IDEA reauthorization contained several specific mandates relative to making the general curriculum accessible for students with disabilities:

• Statements of a child's present level of educational performance to specify how his or her disability affects involvement and progress in the general curriculum.

• IEP teams to design measurable annual goals, including short-term objectives or new benchmarks, to enable the child to be involved-and progress-in the general curriculum.

• A statement of the special education and related services and supplementary aids and services to be provided to the child.

• A description of any program modifications or supports for school personnel necessary for the child to advance appropriately toward the annual goals, to progress in the general curriculum, and to be educated and participate with other children both with and without disabilities.

• IEP team members to document an explanation of the extent, if any, to which the child will not participate with children without disabilities in the general class and activities.

Readers interested in a legal analysis of the issues associated with access to the curriculum are encouraged to review Karger and Hitchcock (2004). The issues associated with access to the curriculum were at the forefront of CAST's work and in 1999 they were awarded a federal grant to establish the National Center on Accessing the General Curriculum that became instrumental in garnering national attention for the potential of UDL.

What is UDL?

Rose and Meyer (2002) reveal the basis of UDL is grounded in emerging insights about brain development, learning, and digital media. They observed the disconnect between an increasingly diverse student population and a "one-size-fits-all" curriculum would not produce the academic achievement gains that were being sought. Drawing on the historical application of universal design in architectural (e.g., curb cuts), CAST advanced the concept of universal design for learning as a means of focusing research, development, and educational practice on understanding diversity and applying technology to facilitate learning.
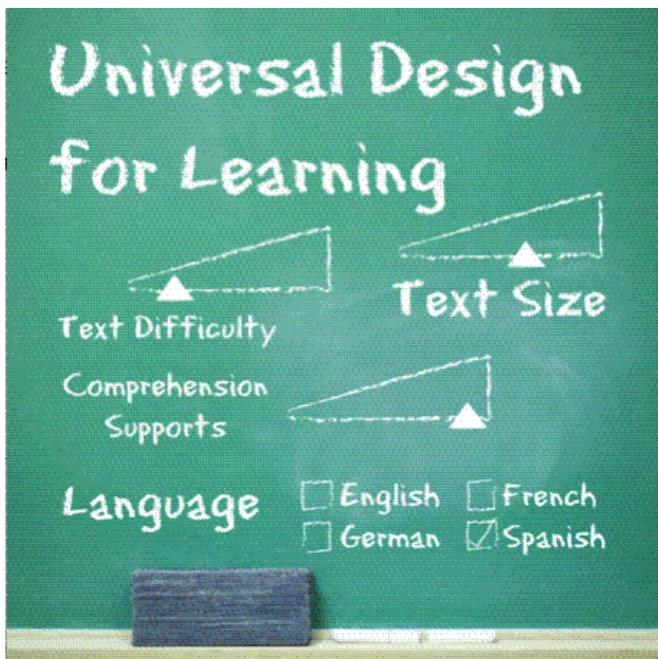
Core Readings in Universal Design for Learning
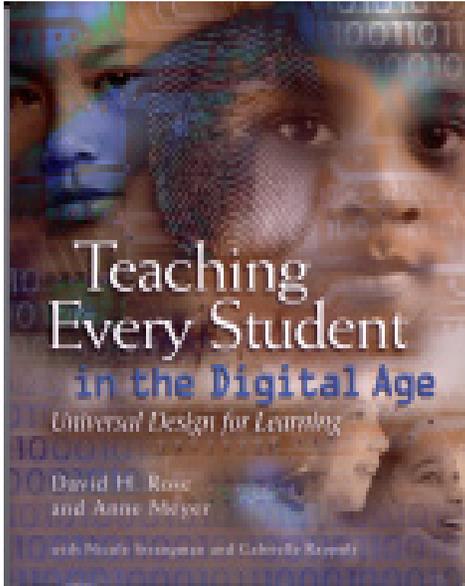
Rose, D., & Meyer, A. (2002). *Teaching every student in the digital age*. Alexandria, VA: ASCD. Available online at: http://www.cast.org/teachingeverystudent/ideas/tes/
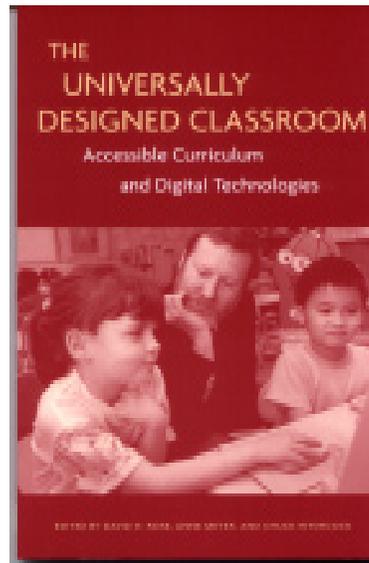
Rose, D.H., Meyer, A., & Hitchcock, C. (Eds.). (2005). *The universally designed classroom: Accessible curriculum and digital technologies*. Cambridge, MA: Harvard University Press.

CAST's philosophy of UDL is embodied in a series of principles that serve as the core components of UDL:

- Multiple means of representation to give learners various ways of acquiring information and knowledge

- Multiple means of expression to provide learners alternatives for demonstrating what they know, and

- Multiple means of engagement to tap into learners' interests, challenge them appropriately, and motivate them to learn.

In the 2004 reauthorization of IDEA, the term "universal design" was officially defined within the federal law (20 U.S.C. § 1401) governing special education:

> The term universal design has the meaning given the term in section 3 of the Assistive Technology Act of 1998 (U.S.C. § 3002).

Following the backward chain of legal reference, here is the definition of universal design as it was included in the Assistive Technology Act of 1998:

> Universal design
> The term "universal design" means a concept or philosophy for designing and delivering products and services that are usable by people with the widest possible range of functional capabilities, which include products and services that are directly usable (without requiring assistive technologies) and products and services that are made usable with assistive technologies. (U.S.C. § 3002)

Recognizing the Value of UDL

UDL has captured the imagination of policy makers, researchers, administrators, and teachers. While initially focused as a strategy for providing access to the curriculum for students with disabilities, it has simultaneous benefits to many other students. UDL provides a vision for breaking the

"one-size-fits-all" mold and therefore expands the opportunities for learning for all students with learning differences. Recognizing and responding to diversity is a core motivation for engaging in UDL practices. Finally, the expectations associated with No Child Left Behind (NCLB) makes UDL an important and timely strategy for enhancing student academic achievement. The mantra that evolved from our understanding of the value of curb cuts: "Good design for people with disabilities benefits everyone," provides a powerful rationale for exploring the large-scale application of UDL in education.

Clarifying Connections

Despite the many attributes of UDL, one down-side has been noted. That is, what is the relationship between UDL and assistive technology (AT)? Some educators mistakenly assume UDL will replace AT since all needs will be anticipated and addressed. Rose, Hasselbring, Stahl, and Zabala (2005) address these concerns by noting that assistive technology and UDL can be thought of as two interventions on a continuum that involves reducing barriers (see Figure 1). At one end of the continuum, UDL seeks to reduce barriers for everyone. At the other end of the continuum, AT is used to reduce barriers for individuals with disabilities. However, in the middle, the interactions of the two interventions merge in a way that prevents clear demarcation of where one ends and the other begins.

Figure 1. The relationship between assistive technology and universal design for learning.
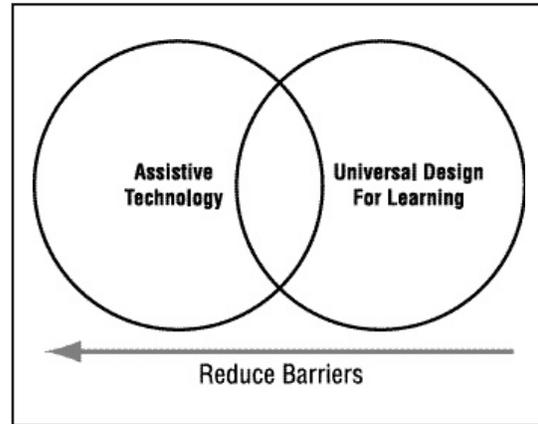
Universal access doesn't just happen. Sch-wan-ke, Smith, and Edyburn (2001) have argued that access for individuals with disabilities to facilities, programs, and information is a developmental process. The A3 model illustrates an ebb and flow of efforts that are needed to obtain universal accessibility (see Figure 2).

In the first phase, Advocacy efforts raise awareness of inequity and highlight the need for system change to respond to the needs of individuals with disabilities. Accommodations are the typical response to advocacy. Therefore, inaccessible environments and materials are modified and made available in phase two. Typically, accommodations are provided upon request. While this represents a

Figure 2
The A3 Model illustrates the developmental phases of accessibility.
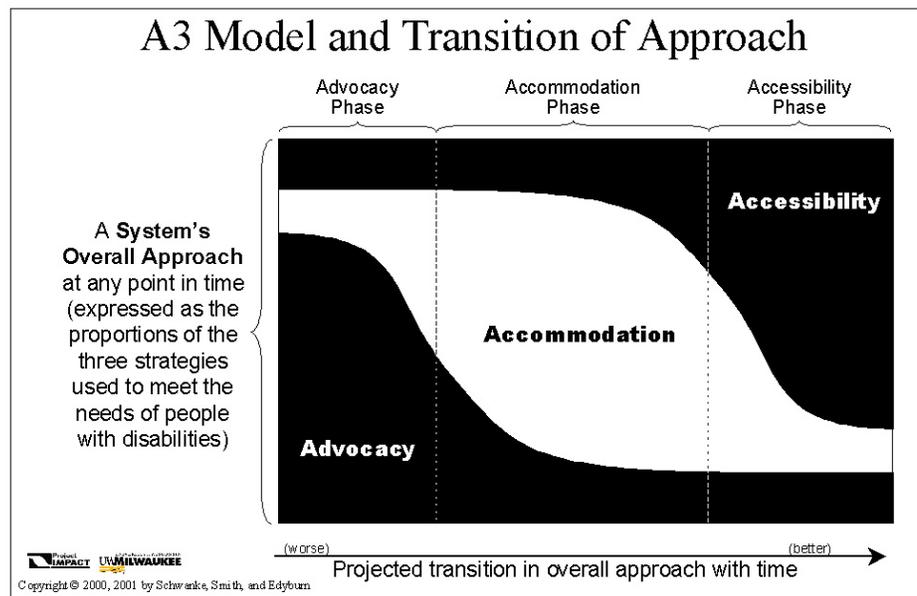
significant improvement over situations found in the earlier phase, accommodations tend to maintain inequity since there may be a delay (i.e., time to convert a handout from print to Braille), it may require special effort to obtain (i.e., call ahead to schedule), or it may require going to a special location (i.e., the only computer with screen reading software is in the library). In phase three, Accessibility describes an environment where access is equitably provided to everyone at the same time.

The proportions illustrated in the graphic reveal the efforts associated with each of the three phases at any point in time relative to the impact of the general strategy being applied (advocacy that argues for need, accommodation to remediate inaccessibility, and accessibility where universal access is provided for all). Thus, the model offers a descriptive audit tool for organizations to self-assess their developmental phase relative to how they are spending their time and energy. While the model illustrates the optimal value of universal design and accessibility, it also suggests the developmental reality associated with the need to make accommodations and modifications when UDL environments are not readily available.

UDL in Practice

After a person has embraced the principles of UDL, there is an urgent feeling to impact daily educational practice. This raises an interesting question: Is UDL a philosophy or an intervention? Actually, it is both. In this section we examine two strategies for operationalizing the principles of UDL.

Universal Access by Design

CAST has developed a number of products in which they have sought to operationalize their concepts of UDL. One such product is Thinking Reader (Scholastic) (see Figure 3). Thinking Reader is a software product that contains electronic books with supports for readers of all skill levels. Specifically designed for Grades 5-8, the Thinking Reader series presents unabridged, grade-level literature (e.g., *A Wrinkle in Time*; *Roll of Thunder, Hear My Cry*; *Tuck Everlasting*) that engage students in reading and interpreting a variety of literary works as they build understanding and fluency.

To begin, students log into the program, click

Figure 3
A screen print from Thinking Reader that provides extensive supports for readers of all skill levels as they interact with award-winning core literature.
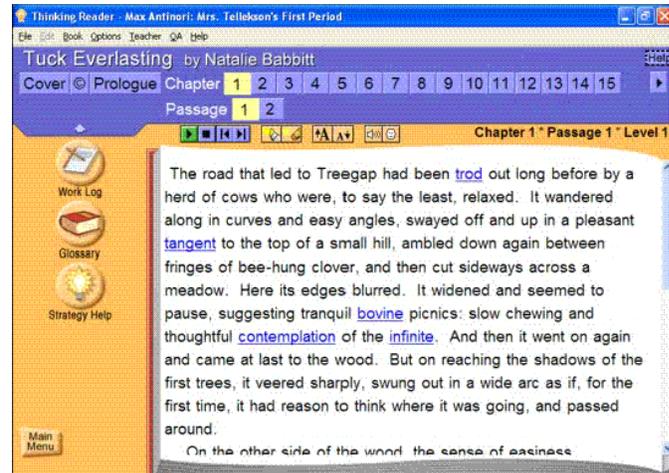

the play button and the software reads the book while the text is highlighted on the screen. Key vocabulary words are underlined indicating a hyperlink; students can click on the word to access a spoken and printed definition of the word. Spanish translations are also provided.

At strategic points, a message appears indicating: "This is a good place to stop and think about the story." Students click on the message and they are linked to directions and questions that engage them in responding to what was just read. Seven research-based effective reading strategies are built into the software: summarize, question, clarify, predict, visualize, feeling, and reflect (see Figure 4). Students answer different types and levels of questions such as open-ended, literal, and interpretative as well as test-like questions such as multiple choice and short answer.

Five levels of embedded reading comprehension support are built into the program. Level 1 readers have the most supports and Level 5 has the least; levels can be adjusted as each student's comprehension skills improve. The program features extensive student performance monitoring and reporting tools that allow teachers to view, print, or export reports (see Figure 5). Thinking Reader serves as a powerful example of the application of UDL principles and the notion of "considerate text" as a means of supporting all students.

Universal Access Through Accommo-

Figure 4
A screen print from Thinking Reader illustrating one of seven explicit strategies that students are taught to use in understanding their reading.
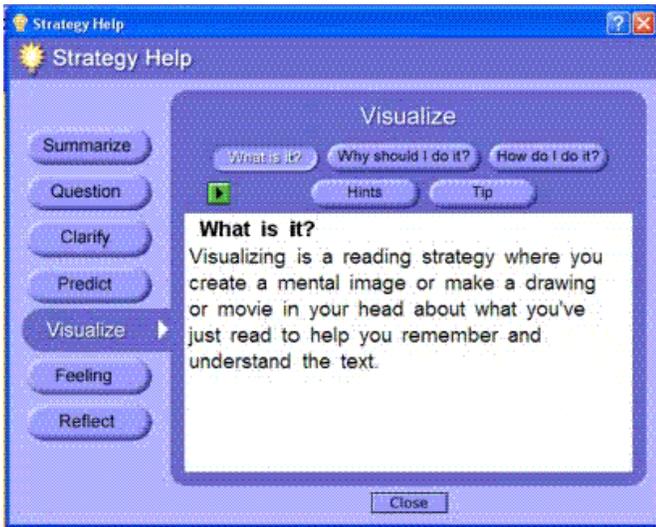
Figure 5
A screen print from the management system within Thinking Reader provides teachers with complete data about the progress and performance of each student.
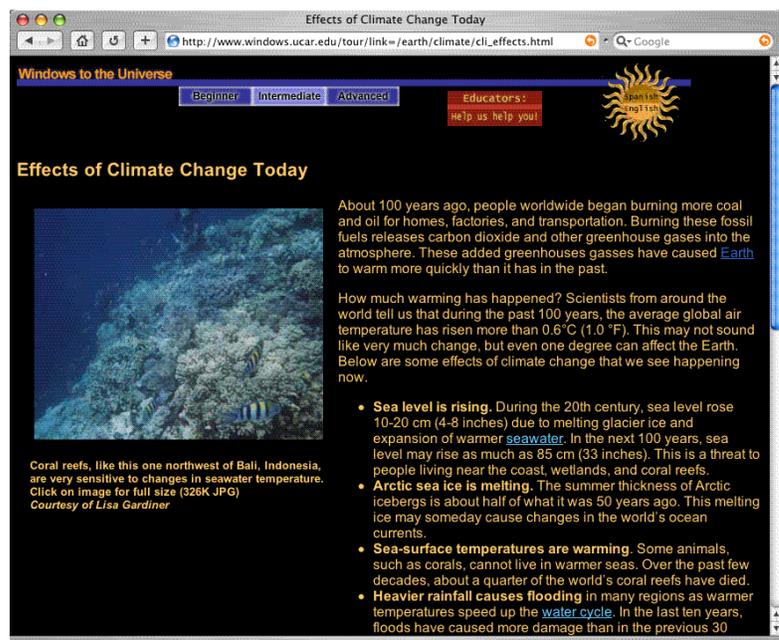

dations and Modifications

When UDL products and environments are not readily available, the principles of UDL can be applied to instructional materials and learning environments in the context of accommodations and modifications. For example, in most science classrooms, the primary method of gaining new information is reading a textbook. However, the textbook poses significant barriers to learning for some students. The font is a static size which presents challenges for students with low vision. Students with reading skills below grade level will not be able to fluently decode and comprehend the information in an efficient and timely manner. Students for whom English is their second language may struggle with the vocabulary associated with key concepts. Consider how the following example of flexible digital media could be used to help the known problems of these select students and how the attributes of these interventions could facilitate learning for many other students in the class.

Tiered Levels

Rose and Meyer (2002) have noted that digital text provides much more flexibility than traditional print formats. Consider the tiered interest levels presented at the Windows to the Universe (http://www.windows.ucar.edu) web site (see Figure 6). The tiers allow students to interact with each topic at a level that is of interest to them (beginner, inter-

mediate, advanced). The information is parallel but presented in less/more detail.

Language Translation

Notice the sun icon presented in the upper right hand corner of each page (see Figure 6) of the Windows to the Universe web site. Clicking on the icon rewrites the page in English or Spanish. Copying the URL of a web page and going to a language translation web site like Babelfish (http://babelfish.altavista.com) allows students to have the content translated to a variety of languages (see Figure 7).

Text to Speech

Figure 7
Babelfish is a free online translation tool that allows users to translate web pages from one language to another. The following example illustrates the web page shown in Figure 6 translated to French.

Another option for students who may struggle to read the information presented on a web page is to use a text to speech tool like the Reading Bar (http://www.readplease.com) (see Figure 8). This Reading Bar is a toolbar that is installed within the Internet Explorer that makes it possible to have the computer read any word on a web page. Or, if a student needs the entire page read to them they can do so easily and privately (with headphones).

Whether UDL principles are embodied in specific products or used to guide accommodations and modifications, the proceeding examples illustrate how flexible digital media and technologies can support student learning in ways that engage them in ways that are not possible with traditional instructional materials.
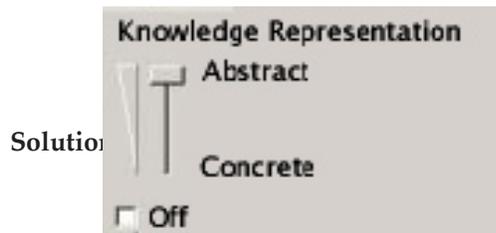
Beyond Access

Access to information is not access to learning (Boone & Higgins, 2005; Rose, Hasselbring, Stahl, & Zabala, 2005). Access is necessary but not sufficient. As a result, it is important to consider how technology and digital media engages a student in meaningful learning activities. When UDL provides the opportunity for a student to access and engage in learning, as minutes of engaged learning accumulate (i.e., time on task), deep learning occurs. Deep learning, sustained over time, is what leads to significant gains in academic achievement.
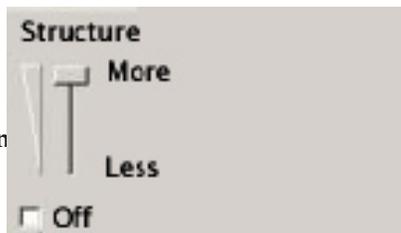
The concept of a volume control slider is a useful metaphor for describing the supports and choices that are presented to students in a UDL environment. Tomlinson (1999), known for her work in differentiated instruction, uses the term "equalizers" to discuss the concept of a slider. She envisions a number of equalizers that could be developed to control the level of challenge and support a student needs throughout the learning process.

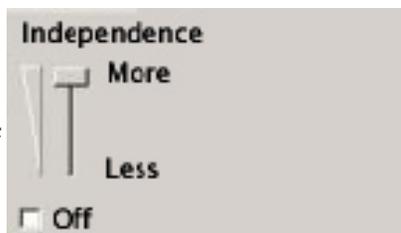For example, consider sliders such as:
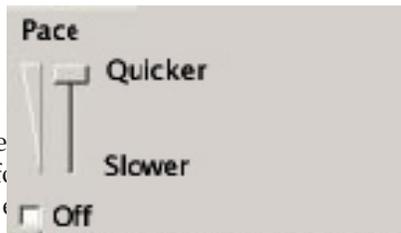
Knowledge Representation/Ideas/Applications

Figure 8
The ReadingBar is commercial software that is installed inside of Internet Explorer to provide text to speech capabilities for reading any web page.

Knowledge Representation
Abstract
Concrete
Off

Solution

Structure
More
Less
Off

Planning

Independence
More
Less
Off

Pace of

Pace
Quicker
Slower
Off

The... ...erful
vision fo... ...they
seek to ... ...nt at an
appropriate level of challenge and as the palette of
supports is expanded.

Learn More

The purpose of this article was to provide
an overview and introduction to the concept of
universal design for learning. To continue learning
more about UDL, consider the following activities:

1. Read the two core books on universal design for
   learning (see list on page 17).

2. Explore tools and activities assembled by CAST
   to faciliate the use of UDL in practice: http://
   www.cast.org/teachingeverystudent/tools/.

3. Sign up for the National UDL Consortium News-
   letter to stay up-to-date on new developments
   in UDL: http://www.cast.org/pd/consortium/
   signup.html.

4. Gather a group of colleagues and commit to
   reading and discussing the article: *Using Flex-
   ible technology to meet the needs of diverse learn-
   ers: What teachers can do* (source:http://www.
   wested.org/cs/we/view/rs/763).

References

Boone, R., & Higgins, K. (2005). Designing digi-
tal materials for students for disabilities. In D.
Edyburn, K. Higgins, & R. Boone (Eds.), Hand-
book of special education technology research
and practice (pp. 481-492). Whitefish Bay, WI:
Knowledge by Design.

Karger, J., & Hitchcock, C. (2004). Access to the
general curriculum for students with disabili-
ties: A brief legal integration. Online document:
http://www.cast.org/ncacAccesstotheGeneral
Curriculum for StudentswithDisabilitiesABrief
LegalInterpretation 4672.cfm

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

Rose, D., & Meyer, A. (2002). *Teaching every student
in the digital age*. Alexandria, VA: ASCD. Avail-
able online at: http://www.cast.org/teachingev-
erystudent/ideas/tes/

Rose, D.H., Hasselbring, T.S., Stahl, S., & Zabala,
J. (2005). Assistive technology and universal
design for learning: Two sides of the same coin.
In D. Edyburn, K. Higgins, & R. Boone (Eds.),
*Handbook of special education technology research
and practice* (pp. 507-518). Whitefish Bay, WI:
Knowledge by Design.

Schwanke, T.D., Smith, R.O., & Edyburn, D.L.
(2001, June 22-26). A3 model diagram developed
as accessibility and universal design instruc-
tional tool. RESNA 2001 Annual Conference
Proceedings, 21, RESNA Press, 205-207.

Tomlinson, C.A. (1999). *The differentiated classroom:
Responding to the needs of all learners*. Alexandria,
VA: ASCD.