**Diversity of Students’ Educational Needs**

Walk into most public K-12 classrooms and you will notice a great diversity of students with a variety of learning needs. Federal law requires all K-12 schools receiving federal funds to report student achievement data disaggregated by race, ethnicity, poverty rate, linguistic diversity, and special education status. It is no longer acceptable for educators to say, “I taught them; they just didn’t learn.” Instead teachers are expected to deliver standards-based curriculum using a variety of instructional strategies and assessments to meet the needs of increasingly diverse students in an educational environment with fewer resources and greater accountability.

The most recent statistics on educational placement indicate that almost 95% of all special needs students attend regular public school, and the majority (58%) spend most of their day in mainstream classes. (USDOE,2011) [[1]](#footnote-1) Special educators divide eligible disabilities into high incidence and low incidence. High incidence categories include students with autism, emotional disturbance, intellectual disability, other health impairments, specific learning disabilities, and speech or language disorders. Students who are diagnosed with attention deficit/hyperactivity disorder (ADHD) may receive services under the Individuals with Disabilities Act (IDEA) or under section 504 plan of the Rehabilitation Act. When Congress reauthorized the Individuals with Disabilities Act (IDEA) in 1997, the special education law included a provision that as schools plan students’ Individual Education Plans (IEPs), they must consider assistive technology. This expanded the requirement to use technology to 3.2 million students with mild disabilities such as behavior disorders and mild cognitive disorders.

According to the National Center for Education Statistics (USDOE,2011)[[2]](#footnote-2) in 2008-2009, 6.28 million students with high incidence disabilities were served under IDEA. These are the students most commonly taught in regular education classrooms. An additional 2 million students with low incidence disabilities, such as deaf-blindness, hearing impairments, orthopedic impairments, traumatic brain injury, visual impairments, and severe cognitive disabilities, may be served in regular education or special education classrooms, depending on the students’ specific Individual Education Plan (IEP). Moreover, in 2006, over three million children (3,236,990) were identified as gifted and talented students. [[3]](#footnote-3) Finally, the most recent estimates (2009) of the number of English Language Learners[[4]](#footnote-4) indicate 21% or 11.2 million of the 53.3 million students ages 5-17 speak a language other than English at home, and 5% or 2.6 million of all students speak English with difficulty. Of these students who struggle with English, the largest group (73%) are Spanish speakers.

Universal Design for Special Needs

http://abavtooldev.pearsoncmg.com/myeducationlab/singleplay.php?projectID=education

altechnology&clipID=EDTH\_038.flv

1. What are the three stages of universal design?

Stage 1: Universal design begins with the process of Advocacy which raises a concern.

Stage 2: This Attention to the problem leads to Action.

Stage 3: Assistive Technology is developed to provide an Accommodation.

Good design for accessibility for people with disabilities is good design for all people.

**2.** How has the universal design principle influenced the design of computers?

Assistive technology is now built into the control panels of most computers, e.g., to magnify text size and enable text to speech for sight-impaired students.

**3.** How can technology support students with limitations in cognition?

Researchers are addressing the problem of one size fits all resources by developing electronic text books which can be adjusted to fit the students’ reading level. They are creating a “slider” feature that enables the teacher or student to dynamically adjust the reading level. For example the reader can adjust the page to include more pictures and less text.

4. How does Universal Design for Learning compare to Tomlinson’s Differentiated Instruction?

|  |  |  |
| --- | --- | --- |
| Student needs: | Universal Design for Learning | Differentiation Model |
| access to content | **multiple means of representation** | **Modify** access to instructional **content** |
| opportunity to demonstrate knowledge or skills | **multiple means of expression** | **Differentiate product** by which student demonstrates learning |
| active engagement | **multiple means of engagement** | **Modify process** or learning activity |

**Principles of Universal Design for Learning**

Universal Design for Learning is based on three principles that reflect the requirements of IDEA (2004) to provide flexible goals, methods, materials and assessment for learners with special needs. These three principles are: multiple means of representation, multiple means of expression, and multiple means of engagement. The purpose of Universal Design for Learning is to “customize instruction so students of diverse abilities, skills, and interests can learn the same standards-based curriculum and be assessed fairly on what they know.” (Rose, Meyer, and Hitchcock, 2006, p. 9) [[5]](#footnote-5)

According to the Center for Applied Special Technology (CAST) the three principles of universal design reflect three types of activity networks that are activated in the brain while learning occurs: recognition, strategic, and affective (Rose, et al, 2006). First the learner needs to *recognize* or receive and analyze information. Educators need to provide multiple means of representation or access to the curriculum such as reading a variety of texts at a variety of grade levels, listening, viewing a demonstration or multimedia presentation, interviewing, manipulating, experimenting, collaborating with other students.

Second the learner needs to *strategize* or plan and carry out learning activities. Students should have the opportunity to demonstrate what they know through multiple means of expression such as writing, illustrating (drawing, painting), speaking, performing (acting, singing, playing musical instruments), creating multimedia, conducting an experiment or participating in a simulation.

Third the learner needs to *affectively evaluate* and set priorities for learning activities. Thus teachers need to provide multiple means of engagement. Within the curriculum standards, students should have choices of topics, resources, activities, and incentives. Skills should be taught with models of performance and multiple opportunities for practice and feedback.

“Individuals who are defined as learning disabled within print-based learning environments are not the same individuals who are learning disabled within video or audio-based learning environments. (Rose et al, 2006, p. 24) Assistive technologies are designed to narrow the gap between the student’s ability to perform and the requirements of the learning task. Computers can magnify text or translate text to speech for visually impaired students; computers can also translate speech to text or depict an avatar that signs for hearing impaired students. Digital media are inherently modifiable to meet learners’ needs because they separate the content to be learned from the display of the content. For example text can be presented in a larger size, or as a concept map or graphic organizer. Digital media can include hyperlinks to background information, animations, graphics, sound files, and video demonstrations. Multimedia tools also enable students to present what they have learned in myriad ways.

**4.** Consider a student who is visually or hearing impaired. How would you provide multiple means of representation for this student in a language arts class?

* Visually impaired student: use a computer to magnify text or translate text to speech, provide audio files
* Hearing impaired student: use a computer to translate speech to text or depict an avatar that signs; provide animations, graphics, and video demonstrations that are close captioned.

**5.** Consider a student who has an IEP for reading and writing four grade levels below age level. How would you provide multiple means of expression for this student in a social studies class?

Provide alternate ways for the student to show what he or she has learned such as,

* illustrating the topic by hand or with a digital graphics tool
* presenting an oral report via a multimedia presentation tool
* analyzing or creating song lyrics that express the topic
* participating in a simulation or skit
* creating a concept map with words and pictures, e.g., Inspiration

**6.** Consider a student who has a 504 plan for ADHD. How would you provide multiple means of engagement for this student in a math class? Consider the student’s need for variety as well as structure and focus.

* provide opportunity to use manipulatives to solve math problems
* provide a choice of digital math games
* allow the student to use a handheld or digital calculator
* assign the student to a partner who will help the student stay focused as the two work together to solve a problem
* encourage the student to set a reasonable goal for completing a task and self-select a reward when the goal has been achieved

**Exploring Aspects of Assistive Technology**

Explore five assistive technology software programs that assist students with reading and writing. Explain the features of each program. You may wish to do Internet research to find additional information about the software beyond what is featured in the video.

Choose from the following:

1. Auto Summarize found on the tools menu of Microsoft Word

For students who cannot read and comprehend at the level of the text, an abbreviated or highlighted text is often helpful. The teacher highlights the document, clicks on Auto Summarize in the Microsoft Word tool menu, and chooses a summary ranging from 10-75% of the original document. The teacher can choose to highlight the key points, create a new document with the summary, or insert a summary or abstract at the top of the document.

1. Text to Speech programs such as Natural Reader <http://www.naturalreaders.com/education.htm>

Text to speech programs such as Natural Reader help students who have difficulty reading. These students may have dyslexia, attention deficiency, visual processing disorders, impaired vision, or may be English language learners. Using the text to speech program, students hear the words and simultaneously see the words highlighted on the computer screen. The program can also convert ebooks to audio books which can be downloaded to iPods.

1. Visual thinking and writing programs such as Inspiration or Kidspiration ©2011 Inspiration® Software, Inc [http://www.inspiration.com/](http://www.inspiration.com/Freetrial)

Inspiration and Kidspiration ©2011 Inspiration® Software, Inc help students develop their ideas and organize their thinking as they create pictures and diagrams about a specific topic. Students can create concept maps, idea maps, webs, flow charts and storyboards. With one click they can also use the outlining tool to transfer their visual graphic into an outline for writing. The software also facilitates students’ creativity as they rearrange ideas, create symbols, add links, pictures, and animation. Kidspiration will also “speak” the pictures to the students.

1. Word prediction programs such as Co:Writer <http://www.donjohnston.com/products/cowriter/features.html>

Co:Writer is a word prediction program that enables the student to find the correct words to create sentences. It is designed to help students who struggle to write due to difficulty with spelling, syntax or translating thoughts into writing. Often these students have an easier time expressing themselves orally than through writing; many of them have trouble writing by hand. Co:Writer uses Linguistic Word Prediction to help students select the word that fits within the sentence structure. It also uses Flex Spell which identifies words based on phonetic or inventive spelling, letter reversals or letter omissions.

1. Websites with leveled reading and translations such as Windows to the Universe http://www.windows2universe.org

Windows to the Universe ® is a science website created by the National Earth Science Teachers Association that features leveled reading and translations. All students in the class can be reading about the same content area but at different reading levels. The teacher or the student selects the topic and then clicks on “beginner”, “intermediate”, or “advanced”. Hyperlinks are embedded in the text so students can click on key terms for additional information. Students can also read the text in English or Spanish.

1. U.S. Department of Education, National Center for Education Statistics. (2011). *The Digest of Education Statistics 2010* (NCES 2011-015), [Table 46](http://nces.ed.gov/programs/digest/d10/tables/dt10_046.asp). [↑](#footnote-ref-1)
2. U.S. Department of Education, National Center for Education Statistics. (2011). *The Digest of Education Statistics 2010 (NCES 1011-015)*, Table 45. [↑](#footnote-ref-2)
3. U.S. Department of Education, National Center for Education Statistics. (2011). *The Digest of Education Statistics 2010 (NCES 1011-015)*, Table 48. [↑](#footnote-ref-3)
4. Institute of Education Sciences, National Center for Education Statistics. (2009). The Condition of Education, Table A-6-2. Retrieved 11/20/11 http://nces.ed.gov/programs/coe/tables/table-lsm-2.asp [↑](#footnote-ref-4)
5. Rose, D. Meyer, A., Hitchcock, C. (2006). *The universally designed classroom: Accessible curriculum and digital technologies*. Cambridge, MA: Harvard Education Press. [↑](#footnote-ref-5)