Using Technology Successfully

Kathleen Darroch
NTID at RIT
kdndis@rit.edu

Nancy M. Castle
Northern Illinois University
ncastle@niu.edu

Technology in the Classroom

Educators working with all age groups have been increasingly called upon to include technology in their teaching repertoire. Technology in the classroom is considered "a main integral part of providing a high-quality education" (U.S. Dept. of Education, 2003, p.3)   Moreover, the federal commitment to increasing and improving technology in the classroom has been evidenced over the years via funding priorities under the Technology Literacy program more recently called the Enhancing Education Through Technology program (U.S. Dept. of Education, 2003, p.3).

Incorporating technology in the classroom is not without its challenges however. Nowhere is that more true than for classes that include students who are Deaf or hard-of-hearing. While technology can improve access to learning materials and enhance interest in course subject matter for most students, it may paradoxically prove an additional barrier to the ease of learning for Deaf and hard-of-hearing students. Classroom activities that involve watching something while listening to an explanation/information about it, proves problematic for Deaf people who use their eyes where hearing people use their ears…to take in information being communicated while visually integrating an example. The dual-visual task for Deaf people requires that they assign their eyes to the communication/information task as well as the visual integration/example task. This provides for serious interruptions in the flow of information and can often be confusing in situations where an instructor is stingy with words on the assumption that the visual example will clarify the content being provided.

Addressing the Challenge: Universal Design for Learning

What can be done to assure that Deaf and hard-of-hearing students are able to enjoy the full benefits of technology as part of their academic experience? This question has received attention for more then 20 years through the work of researchers and instructional technology experts working in the field of disability-educational access. Most notable in this field is the work being conducted by the Center for Applied Special Technology (CAST), based in Wakefield MA and proponents of the Universal Design for Learning (UDL). Borrowing from the tents of architecture's Universal Design, which stresses "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (NC State University, 1997). UDL, also known as Universal Instructional Design, calls for accessibility of *learning* materials to allow more ready access for all students but especially those with disabilities (CAST mission statement; Hitchcock & Stahl, 2003).

A basic goal of the UDL approach is to engage students in the learning process. This is accomplished through the following four principles as found in the CAST web site:

- Multiple representation of content
- Flexible means of expression
- Flexible means of engagement and
- Flexible means of assessment.

(http://www.cast.org)

In other words, this is done by providing information in a variety of ways, allowing for a variety of ways for learners to demonstrate what they have learned and that they have learned it, and doing so in a way that provides for a variety of ways to engage learners in the process of learning (CAST; Howard, 2003). For instructors who feel overwhelmed at all of this variety, in may help to think in terms of a "decision tree" or in this case, a decision ivy where there are many roots that all sustain the plant! To assist in developing a personal decision guide for incorporating UDL into coursework, it may help to choose a single starting point. While all of the principles listed above are important, this presentation will single out two that are highly related and that have perhaps the most importance when addressing the needs of Deaf and hard-of-hearing students: multiple representations of content and flexible means of engagement. We suggest you choose one of these as your starting point.

In order to assure that students are primed to learn information being delivered, UDL suggests that instructors utilize many methods for presenting it. A framework for executing this may be found in a popular learning styles approach – one that categorizes learners as those who access information more readily through visual means, auditory means or tactile means (there are many excellent resources available with a full discussion of this subject; for review please see Brown, 2000). This framework is useful too when addressing the needs of Deaf and hard-of-hearing students in a classroom. If one thinks about "disability" as simply an extension of the learning styles/preferences model, it becomes an issue of including of all students and not conducting separate actions that single out these students. A project funded by the U.S. Department of Education, Office of Postsecondary Education awarded to Northern Illinois University (1999 – 2002) (Long, 1999) reported success in using this approach to assist faculty in their efforts to accommodate for students with disabilities. Reports from faculty participants indicated that the adoption of UDL via an extension of the learning styles approach helped them to make accommodations with greater ease by broadening their delivery beyond simply lecturing on readings (Franks & Castle, 2005). When considering multiple representations of content, the UDL principle of flexible means of engagement also comes into play. By engaging students vis-à-vis their preferred learning style, information may be repeatedly presented, e.g., once in an auditory format, once in a visual format and once in a tactile format. Flexible means of engagement calls for flexibility in curricular materials to include both novelty and familiarity. This means doing the unexpected and referring it to real-life examples when possible. Doing the unexpected may be something as simple as breaking into song as some professors have been known to do it as a way to introduce a mnemonic for a rote memorization task. Singing off key? Also (hopefully) the unexpected!

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Harkening back to the need for guidance on the task of converting existing courses to include the principles of UDL, instructors need look no farther than their own course objectives. Course objectives should guide decisions. For example, is it important that students know how to do something or is it important that they answer a multiple choice question about it? Effective instructors let what they want students to know drive decisions about how they help students to learn it. The goal is to get students engaged in the subject matter – remember that their learning style influences how students absorb information. What other ways might the information be presented? That is where the principles of UDL come into play.

In today's times, any consideration of the (re)design of classes to incorporate the principles of UDL, must include the use of technology. Today's students have grown up in an environment of technology – television, personal computers, the Internet, e-mail, cell phones, text messaging, instant messaging – these are all commonplace to the typical postsecondary student.

Technology and UDL

The National Council on Disability (NCD) report, *Access to Multimedia Technology by People with Sensory Disabilities* (1998), addresses the types of technologies that have been or are being developed for use in the classroom and workplace. The report makes strong mention of barriers thrown in educational paths of students with special communication needs, stating that, "…technological developments can present serious and sometimes insurmountable obstacles when principles of universal design are not practiced in their deployment." (NCD, 1998) The report does not address the need for training for educators in order to develop skills for effectively integrating technology and auxiliary aids such as interpreting, C-Print and note taking services. Often there is an assumption made among educators that placing interpreters in classrooms will resolve issues of communication and provide a level playing field for access to information and learning. Accessibility, however, requires more than just introducing auxiliary aids and/or technology into the classroom. Effective accessibility necessitates an awareness of how best to incorporate technology with students who are Deaf and hard-of-hearing *and* an understanding of pedagogical accommodations that complement interpreting services and other auxiliary services.

As an example, educational and recreational films and videos are commonly used in K-12 classrooms and in postsecondary settings. Research has documented the benefits of captioning for students who use English as a second language, students with learning disabilities, and students with other special educational needs (NCD, 1998) website for access to a variety of reports on this topic). Sadly, the NCD, reporting on data from1995, stated "…80% of all general-interest videos and 95% of all educational videos are still not accessible to Deaf and hard-of-hearing individuals. …The failure to caption resulted in heavy reliance on sign-language interpreters. (NCD, 1998).

The speed with which auditory information is compressed on videos and other A/V materials results in an almost constant stream of uninterrupted interpreting. Most interpreters willingly admit the physical impossibility of capturing information from uncaptioned materials. At best, interpreters can highlight key information and provide a summarized version of the auditory text. Students are forced into making decisions to attend solely to the interpreter and miss all other visual information, or to judiciously disconnect from the interpreted information stream and hope the lost information is not vital to an understanding of key concepts and information.

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The Rochester Institute of Technology (RIT) has a published university policy, which promotes the use of captioned materials to support the educational learning experiences of Deaf and hard-of-hearing students. The policy can be found on the Class Act website (http://www.rit.edu/~classact/) under "Support Services: Materials and Media." NTID's Project Access strongly promotes the Universal Design approach for enhanced educational accessibility. The strongest pedagogical approach would be for instructors to only use media that is captioned and provide a synopsis of key concepts and information. In addition, instructors should work with university administrators to secure resources for captioning of all materials that are used regularly in classes. For computer work, captioned software such as Encarta provides enhanced visual accessibility when instructors also educate themselves on how to integrate technologies with auxiliary services. The NTID COMET site describes the ease of use of this type of software stating that, "when educational software has a streaming video and audio, there may be a means for pulling down captions so that deaf and hard-of-hearing students can have access to what is being said. An example of this is Encarta by Microsoft, which has a video of Martin Luther King giving his "I have a dream" speech in Washington, D.C. Clicking on a button can pull down the entire speech. Hopefully, the future of educational software and web sites will include more such access." (See: http://www.rit.edu/~comets/pages/workshops/technologyinclasswkshop.html#computer)

The Class Act website further describes principles and gives a brief history of Universal Design (www.rit.edu/~classact/side/universaldesign.html) and lists useful resources for those interested in learning more about integrating Universal Design concepts (i.e., the concepts UDL) into their instructional methodology. Deaf and hard-of-hearing students are not the only beneficiaries of this principle. International students and hearing students frequently inform interpreters that they seek out "supported" classes in the knowledge that the accommodations support their educational experiences as well.

Technology and Classroom Interpreters

Regardless of what technology is used in the classroom, it is important to remember that interpreters facilitate communication, linking verbal information with visual and auditory information produced by breathing and non-breathing members of the class! Technology can create competing information demands for the interpreter to process and the students to watch. Instructors must remember to control the communication flow to allow the interpreters to capture all the information, properly match auditory and visual communication, and reduce incidences of what researcher Marc Marschark and associates describe as, "attentional multitasking required when Deaf students divide their attention between simultaneously-provided visual communication from instructors/interpreters and visual display materials" (Marschark, Pelz, Convertino, Sapere, Arndt, & Seewagen, 2005).

The following tips will assist instructors in the integration of technology and interpreting services,

- Keep lines of sight between visual information and interpreters clear and connected.
- Set the pace so information is presented in an orderly process with sufficient pauses for the interpreter to understand, translate and express (either vocally or through sign). What is being said should match what is being displayed via visual aids.

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- When referencing materials use specifics rather than vague wording. Names, physical descriptions, letters or numbers will allow all your students to zoom in on what is being referenced.
- Practice information turn taking; don't hit your students with all the bells and whistles simultaneously.
- When using PowerPoint – more can be too much. Be careful not to overfill your slides. Use color-coding, animation and graphics with discretion.
- Information should be made as visual as possible to support the interpreting process, highlight key concepts, vocabulary, and equations…and reduce interpreting omissions.

Summary and Conclusion

The use of technology in a classroom with Deaf and hard-of-hearing students presents some challenges. Instructors are encouraged to incorporate technology as it keeps students interested and many times can be the preferred mode of conveying information in these times of high speed access to information.

Hopefully the ideas discussed in this paper and presented in the workshop and on-line resources included will provide long-used guidance for instructors. A guide for decision making with regard to incorporating the principle of UDL into course efforts includes:

- Let the content and the student drive instructional delivery methods
- Use course learning objectives as a guide for content decisions
- Choose methods that will engage students in the material
- Recognize that auxiliary aids (e.g., interpreters) are a part of the delivery decision

Of key importance is remembering that introducing technology introduces additional challenges for interpreters in the classroom and instructors must work to reduce the amount of visual multi-tasking for Deaf and hard-of-hearing students and support the work of interpreters. Incorporating technology in education can be as much fun as a 3-ring circus! The instructor is the ringmaster, directing students toward a visually effective and fully accessible educational experience. Remembering these tips for including your Deaf and hard-of-hearing students more effectively will make incorporating technology beneficial for everyone!

Resources

There is a wealth of information available to assist instructors. Readers are encouraged to go to the Department of Education – Office of Postsecondary Education web page to review the list of grantees receiving funds to develop techniques for assisting faculty to work more effectively with postsecondary students with disabilities. The web site listing awardees in the current cycle (2002 – 2005) can be found at: http://www.ed.gov/programs/disabilities/awards.html.

In addition, the following web sites were accessed on May 26, 2005 and are recommended for further information on the topics discussed herein. This is not a complete list. There are many helpful sites available and a search engine search on "Universal Learning Design," "Learning Styles," or any combination of technology, access, disability, accommodations plus classroom should also yield some valuable results.

- Project Access – Promoting access for Deaf and hard-of-hearing students: www.rit.edu/classact
- National Captioning Institute (NCI): www.ncicap.org
- National Council on Disability (NCD) Access to Multimedia Technology by People with Sensory Disabilities: http://www.ncd.gov/newsroom/publications/1998/sensory.htm
- Clearinghouse on Mathematics, Engineering, Technology and Science (COMETS)/NTID. Technology in the classroom: Captions: www.rit.edu/comets/
- Center for Applied Special Technology (CAST): www.cast.irg
- Disabilities, Opportunities, Internetworking, and Technology project (University of Washington): http://www.washington.edu/doit/
- HEATH resource center: http://www.heath.gwu.edu/index.htm

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