

# **Resource for Educators using Technology with Deaf and Hard of Hearing Students**

## **Review of Literature**

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*Introduction and Background*

Because deaf people use a visual language, their mode of communication exchange occurs mostly ideally in person. With the development of webcams and image-capture software, a new communication space has arisen. Technology is now an integral part of the deaf community. Across borders and time zones, it is allowing many deaf people the ability to connect visually and the means to use their native sign language. The deaf community has also embraced this use of technology. Yet, the idea of using technology is consistently overlooked as a tool in the education of d/Deaf and Hard of Hearing (d/Deaf HH) students.

“Though specific technologies change, the patterns of acceptance and integration into educational setting typically have remained constant.” (Parton, B. 2006) As new technology emerges in the field of education, quite often teachers and administrators tend to resist the change and stay with more familiar tools such as a chalkboards and books. Educators, working with d/Deaf HH students do not have access to a knowledge base from which to draw upon on how to integrate technology into their teaching design. “Roberson (2001) found that the number one issue stopping deaf education teachers from using more computers was time, again mirroring general education. Time, resources, and training, however, are first-order barriers to technology integration; attitudes, beliefs, and practices are second-order barriers.” (Earle, 2002)

The U.S. Department of Education in their 2005 Join Together report stated it perfectly, “There is limited amount of data in the literature about classroom technology research in deaf

education and even less on technology integration and the impact of technology upon academic performance.” Clearly pointing out, even now, five years later, there is still not enough data for educators to access; this can discourage the use of technology with d/Deaf HH students in an academic setting. There is not enough support to use technology in education due to the lack of training or stop-gaps from administrators that protest – not enough money, use what you have. On top of that, there is very little information on how to integrate technology as part of the curriculum with d/Deaf HH students.

There are two different paths educators can take if they are interested in making technology a part of their teaching agenda. They can turn to Disabled Students service providers or to those who are trained in Assistive Technology. But in that realm, educators tend to think of technology as a communication tool used to enable d/Deaf HH students to have access to education such as captioning videos for online learning environments or in the classroom (quite often videos are not captioned ahead of time). Or technology may allow the d/Deaf HH students to communicate with their instructors or classmates by using video remote interpreting. Even though assistive technology is narrowly defined and supported by Americans with Disabilities Act, educational technology is broader and has a plethora of options. In short, using educational technology in the classroom can become a playground for educators with the training, leadership and time. The wealth of information in educational or instructional technology can be overwhelming for those that do not have time, guidance, or are new to the world of technology.

To empower educators with technology, it is best to define the differences between,

Assistive Technology (also labeled by a less common name, Adaptive Technology) and Educational Technology which is also known as Instructional Technology.

*What is Assistive Technology?*

Assistive Technology is the more familiar buzz word on many college campuses. Most citations on the definition of assistive technology can be tied back to The Technology-Related Assistance for Individual with Disabilities Act of 1988, amended in 1994, and then again amended and called the Assistive Technology Act of 1998 (PL 105-394). To add, under Sec 3., Definition and Rule of the Assistive Technology Act of 1998 is broken down into many subsections. The two most important definitions in this Tech Act is Sec. 3. (a): (2) Assistive Technology. The term `assistive technology' means technology designed to be utilized in an assistive technology device or assistive technology service. In Sec. 3. (a): (3), the term `assistive technology device' means any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities.

Assistive Technology may be narrowly defined and supported by Section 508 of the Rehabilitation Act of 1973 (Section 508) in the realm of education that is funded by Federal agencies or Federal property. Section 508 as defined, requires the development, acquirement, maintenance “or use [of] electronic and information technology,” which Federal employees or members of the public have “access to the use of information and data that is comparable to the access” and provision of information and data to Federal employees and members of “the

public who are not individuals with disabilities.” (Subpart A – General 1194.1 Purpose). Overall goal is to create a more accessible society. Section 508 is a purchasing law that applies to the federal government, but Section 508 did not apply to California until it “was codified in [Government Code 11135](#) (.pdf) by the State Legislature in 2002 through [S.B. 105](#) (.pdf). Government Code 11135 which requires CSU (and all other postsecondary schools) to comply with the accessibility requirements of Section 508 of the Rehabilitation Act of 1973 as amended and to also apply the US Access Board accessibility standards to the electronic and information technology products and services that it buys, creates, uses and maintains.” (ATI, 2010).

California Community Colleges (CCC) already have their own High Tech Center Training Unit (HTCTU) set up and as such, these colleges accepted that Section 508 applies to them before S.B. 105 was implemented. They just added the requirements of S.B. 105 to the work they are already doing by training and being a support facility for faculty and staff who need more up-to-date information working with technology and students with disabilities. The HTCTU provides assistance and support to 110 community colleges and satellite centers in California.

S.B. 302 was designed for CSU schools. It was passed September 2, 2003 and became effective January 1, 2004. This gave birth to the Accessible Technology Initiative (ATI), which reflects the California State University’s (CSU) ongoing commitment to provide access to information resources and technologies to individuals with disabilities. This commitment is articulated in [Executive Order 926 \(EO 926\)](#), the CSU Board of Trustees Policy on Disability Support and Accommodations: *“It is the policy of the CSU to make information technology*

*resources and services accessible to all CSU students, faculty, staff and the general public regardless of disability."* There is not much information on the University of California Chancellor's website on how they are implementing Govt. Code 11135.

The use and implementation of Assistive Technology has taken a long tangled journey through the legal systems of the United States of America and through the state of California to allow students with disabilities which includes d/Deaf HH to have access to electronic means and information. On the other hand, Educational Technology has a different kind of journey for the educator, not necessarily how Educational Technology came to be an integrated part of education, as much as how assistive technology has become a mainstay of a d/Deaf HH students' education. Educational Technology does not have the same kind of barriers in its creation but more so in its ability to become a part of the teaching design due to lack of training, leadership and time.

### *What is Educational Technology?*

Education or Instructional technology has a broader definition that is not so wrapped up in our government but more so in education. But it can also be difficult to define. One can assume that it can be the application of technology as part of a d/Deaf HH student's learning process. Due to the wealth of information out there, it is much more than that. According to a government report of Task Force on Instructional Technology printed 1970, the section titled Instructional Technology in Teaching and Learning Process summarized six areas on how Educational Technology can benefit teacher education and the student. The six areas are 1)

technology can make education more productive, 2) technology can make education more individual, 3) technology can give instruction a more scientific base, 4) technology can make instruction more powerful, 5) technology can make learning more immediate, and 6) technology can make access to education more equal. A more recent source, Association for Educational Communications and Technology did point out that current standard, have changed from earlier versions due to roles and functions of educators involved in educational technology. Their website develops and defines Instructional technology as “the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning.” (AECT 2001) The Presidential Commission on Instructional Technology highlighted four performance areas: 1) Design of instruction, 2) Production of instructional products and events, 3) Management of instructional settings and resources, and 4) Evaluation of instructional programs.” (2010)

Even though Instructional Technology has a looser definition, various organizations that are maintained by the government or non-profit sector have the same say; they all agree on key areas in the design and function of the role that educational technology plays in the classroom or in an academic setting. Instructional Technology also has a role in Distance Learning as a learning tool as outlined in the Office of Educational Technology under the Department of Education’s proposed draft National Educational Technology Plan.

A traditional classroom tends to be set up with rows of chairs and/or desks facing a whiteboard. A deaf friendly classroom is set up in a crescent moon shape around the whiteboard so d/Deaf HH and non-signing students can see each other, the whiteboard (or a SmartBoard), the instructor and the interpreter. There is less unobstructed view of the information regardless of whatever form the medium information is presented. Using visuals in instruction is very important. Using a Powerpoint presentation is a technology tool. Written materials are more productive for all students, inclusive to Universal Design Learning principles and allows the d/Deaf HH student to match course materials and keep in pace with verbal instruction. Using UDL help keep the d/Deaf HH student included by facilitating communication and maintaining clarity of topics discussed by repeating comments and/or questions asked by other students.

An educator would benefit best from implementing the Universal Design for an optional learning environment. Universal Design for Learning (UDL) is borrowed from Universal Design principles: "Universal design is 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." (Mace, 2001) An educator cannot guess what kind of student will walk through their door. Universal Design for Learning "is an educational framework that optimizes opportunities for all individuals to gain knowledge, skill, and enthusiasm for learning." (Meyer & Rose, 2002) This way the needs of all students in the classroom are met. An educator can benefit by using



curriculum and assessment design, implementing the college's mission statement, and improving learning outcomes by recognizing diverse learners are present in the student population, when implementing the UDL principles with the goal in mind that everyone is able to learn with the development of instructional methods, classroom materials, and assessment tools. CAST (Center for Applied Special Technology), a non-profit organization that works with UDL research and development suggested a few tips for educators: 1) provide multiple and flexible methods of presentation to give students with diverse learning styles various ways to acquire information and knowledge, 2) provide multiple and flexible means of expression to provide diverse students with alternatives for demonstrating what they have learned, and 3) provide multiple and flexible means of engagement to tap into diverse learners' interests, to challenge them appropriately, and to motivate them to learn (CAST, 2010). Students, coming from different backgrounds, unique learning styles in the classroom settings, yet standards should not be adjusted according to various learning styles. But by having a learning environment that includes UDL which supports a broader spectrum of students, it makes it possible to improve learning experiences for every one without the need for accommodations. For an example, captioned audio/visual materials for d/Deaf HH students will also benefit to students with attention deficit disorders or auditory processing disorders, students learning English or struggling readers and even students working in a distracting or noisy classroom environment. Using UDL as part of the teaching design benefits the educator and the students and creates a more active learning environment.

*Use of Distance Learning with Deaf / HH Students*

As technology becomes common place in education, more and more teachers are encouraged to use computers as part of their curriculum. Many college campuses have the luxury of classrooms filled with computers, computer labs for every department, and an Information Technology department to support all these computers and intra/internet connections, as well as the ability to teach classes through distance education and the use of online learning environments such as Moodle, Blackboard, and Desire2Learn to name a few. All of this shows that technology is becoming a mainstream component in education. Also many d/Deaf HH students are entering a world where teachers require typed papers, internet research, and email. All students must continue to update their technological skills to be successful on a college campus.

Many d/Deaf HH students have basic computer skills before they enter college, but technology is never used as a tool to support their learning process. Yet, technology, such as a personal computer with a webcam does plays a big part in a d/Deaf HH student's communication style, because it provides access to email, instant messaging, internet chat rooms, video to video software, vlogs (video logs – a visual blog which allows deaf students to communicate online in ASL. There are many vlogs online and DeafRead.com is a popular site), youtube.com and video phones. Since all of this usage occurs at home, it would be logical for an educator to take knowledge about their students to the next level which has happened in the Distance Education field in the form of online classes. More and more resources are allowing

colleges to integrate technology in the classroom, on campus or online as part of their teaching design to keep their d/Deaf HH students actively engaged in the learning process.

Many d/Deaf HH students have enjoyed taking online classes because it allows the anonymity of being just like every other student without an entourage of interpreters, note takers or real-time captioners trailing them from class to class. For the d/Deaf HH student in the online learning environment, equal footing is present because “once appropriate access has been provided to the computer, these students function as equals in the computer classroom, and their disability vanishes. Everyone interacts on the basis of their ideas rather than having the communication shaped by stereotypes based on people's appearances.” (Kinner & Coombs, 1995) Online learning environments can benefit d/Deaf HH students if developed properly and results in the elimination of the need for accommodations such as interpreters in the traditional classroom. Online learning courses give d/Deaf HH more flexibility to interact with their teachers as well as non-signing peers. The options that online learning offers to d/Deaf HH students are anywhere, anytime learning, increased communication, heightened awareness of others, and flexible time considerations. Overall an online learning environment is deaf-friendly if designed with deaf students in mind. “The hope is that this time technology also will aid these students with web-captioning, embedded media, and other solutions, rather than shut them out.” Thompson Ph.D., J. (2002).

The Assistive Technology Act, Section 508 and ATI all support equal access for anyone taking an online class, and many measures are put in place such as using Universal Design principles which was developed to provide accessibility regardless of any ones decision attend

to college. Government entities in other states may look to New York State in guiding them in taking on the “W3C Web Content Accessibility Guidelines as a means to provide optimal access to State agency web sites and the content therein” (Natoli, 1999).

There are still hurdles to overcome. Due to Copyright law and ADA, many schools get trapped between breaking the law with the publishers of audio / visual content and risking a lawsuit with ADA when a d/Deaf HH student ask for captioning for their video or podcast online because of the lack of captioned material. California just passed AB 386: public postsecondary education: instructional materials: disabled students, authored by Assemblyman Ira Ruskin. This bill was an act to amend Section 67302 and to add Section 67302.5 to the Education Code. The bill relates to postsecondary education in regards to audio/visual materials online and in the classroom. ([www.aroundthecapitol.com](http://www.aroundthecapitol.com), 2010) As the author of this review of literature, who was a witness to the process of the bill and helped to get it passed through many layers of voting assembly and senate committees to be finally signed by the governor, it was a source of pride to be a part of the process! Now that New York has their version of this bill, and Texas is in the process of passing a similar one. With the three most powerful and biggest states in the nation on the same page, the rest of the nation will follow and all postsecondary schools will have online and classroom audio/visual materials captioned and accessible. There is a federal bill in the legislation right now called “H.R 3101: Twenty-first Century Communications and Video Accessibility Act of 2009: To ensure that individuals with disabilities have access to emerging Internet Protocol-based communication and video programming technologies in the 21st Century.” ([www.govtracker.com](http://www.govtracker.com), 2010) Having nothing to do with education, this bill is all

about access to the internet. Since many educators all across the nation and even globally, uses the internet as a teaching tool, this bill will ensure access for all students as well as the public.

Previous bills in the state and federal legal system are mentioned since they do have an impact on education and technology. Many times in postsecondary education, technology designed for d/Deaf HH students has been focused on communication access. Quite often the design and use of instructional technology tends to be overlooked for d/Deaf HH students since the use of technology tends to be written off and used as a communication access tool, even though time and time again, it has been proven that advances in technology have a direct impact on the student's educational process. And this is the case, regardless if it is in the form of a computer or pocket calculator or even as assistive technology software or hardware such as remote captioning, or a SmartBoard. They all have a part in the d/Deaf HH student's educational learning process.

### *Integrating Technology with d/Deaf HH Students*

The task of integrating technology with instructional design is overwhelming yet possible. "Technology is only a tool for instruction, not a panacea that totally replaces traditional instructional practices. A good teacher will never be totally replaced by a computer. Once a teacher has the basic skills and the wiliness to experiment, the challenge becomes to determine how lessons can be strengthened by using technology."(Doggett & Montgomery, 2000) Less is more. Start out with one form of technology integrated in the teaching design with the intent of active learning.

References:

Accessible Technology Initiative, Section 508. Retrieved from the World Wide Web March 21, 2010: <http://www.calstate.edu/accessibility/section508/>

Accessible Technology Initiative. Retrieved from the World Wide Web March 21, 2010: <http://www.calstate.edu/accessibility/>

AB 386 (Ruskin) Public postsecondary education: instructional materials: disabled students. Retrieved from the World Wide Web March 23, 2010: [http://www.aroundthecapitol.com/Bills/AB\\_386/](http://www.aroundthecapitol.com/Bills/AB_386/)

Assistive Technology Act of 1998 (P.L. 105-394). Retrieved from the World Wide Web March 20, 2010: <http://section508.gov/docs/AT1998.html#3>

Doggett, Sandra, & Montgomery, Paula. (2000). *Beyond the Book: Technology Integration into the Secondary School Library Media Curriculum*. Libraries Unltd Inc.

Earle, R. (2002). The integration of instructional technology into public education: Promises and challenges. *ET Magazine*, 42(1), p. 5-13. Retrieved August 21, 2005, from <http://bookstoread.com/e/et>

H.R. 3010: Twenty-first Century Communications and Video Accessibility Act of 2009. Retrieved from the World Wide Web March 23, 2010:

<http://www.govtrack.us/congress/bill.xpd?bill=h111-3101>

Kinner, J., & Coombs, N. (1995). Computer access for students with special needs. In Z. L. Berge & M. P. Collins (Eds.), *Computer mediated communication and the online classroom* (Vol. 2, Ch. 4). Cresskill, NJ: Hampton Press.

Mace, R. L., Hardie, G. J., & Place, J. P. (1991). *Accessible environments: Toward Universal Design*. The Center for Universal Design. Retrieved from the World Wide Web March 22, 2010: [www.design.ncsu.edu/cud/pubs\\_p/docs/ACC%20Environments.pdf](http://www.design.ncsu.edu/cud/pubs_p/docs/ACC%20Environments.pdf)

Natoli, J. G. (1999, September 30). Universal Accessibility for NYS Web Sites. Retrieved March 23, 2010, from New York State. Office for Technology Web site: <http://www.cio.ny.gov/Policy/98-3.pdf>.

Parton, B. (2006). Technology-Minded General Educators and Deaf Educators: A Comparison Study. In T. Reeves & S. Yamashita (Eds.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2006* (pp. 2283-2291). Chesapeake, VA: AACE.

Roberson, L. (2001). Integration of computers and related technologies into deaf education teacher preparation programs. *American Annals of the Deaf*, 146(1), p. 60-66.

Rose, David, & Meyer, Anne. (2002). *Teaching every student in the Digital Age: Universal Design for Learning*. Assn for Supervision and Curriculum Development.

Section 508 Standards (Authority: 29 U.S.C. 794d.). Retrieved from the World Wide Web March 21, 2010: <http://www.section508.gov/index.cfm?FuseAction=content&ID=12>

Task Force on Instructional Technology, Associated Organization for Teacher Education (1970). *Instructional Technology in Teacher Education*. Educational / Industrial Cooperation. Organizations for Teacher Education, Washington, DC. ERIC Document ED054050

Thompson Ph.D., J. (2002). Providing an Online Instructional Medium for the Deaf. In D. Willis et al. (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2002* (pp. 2273-2275). Chesapeake, VA: AACE.

UDL Guidelines - Version 1.0 (2010). Center for Applied Special Technology. Retrieved from the World Wide Web March 21, 2010: <http://www.udlcenter.org/aboutudl/udlguidelines>

U.S. Department of Education. (2005). *Join together: A nationwide on-line community of practice & professional development* (OMB Publication No. 1890-0004). Kent, OH: AACE.

What is the Knowledge Base? (2010). Association for Educational Communications and Technology. Retrieved from the World Wide Web March 21, 2010: <http://www.aect.org/standards/knowledgebase.html>