

## Welcoming Diversity in Distance Education at UH Manoa: The Special Education Department's Journey

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**Abstract:** This paper chronicles a 5-year progression in *distance education* delivery by the Department of Special Education within the UH Manoa College of Education. Particular emphasis is given to technology accommodations for students who are Deaf or hard-of-hearing, including interactive video transmission of American Sign Language (ASL) and real-time captioning. The concept of *universal design* is discussed in terms of empowering students with diverse learning needs utilizing mainstream educational technologies.

### Introduction

Beginning in 2002, the U.H. College of Education (COE) committed to the delivery of its degree programs to Hawai'i's neighbor islands via distance education, beginning with a hybrid mix of "face to face" instruction and distance delivery (with the acknowledged aim of diminishing the amount of "face time" as distance technologies evolved and faculty confidence grew). Toward this end, a COE *Office of Outreach and Distance Education* was created under the leadership of Dr. Paul McKimmy and COE departments were encouraged to volunteer, with the promise that their faculty would be *fully supported* with appropriate technology tools and mentoring (including release-time for course preparation); and that participating outreach students would be provided with sustained consultation.

The Department of Special Education responded to the challenge by volunteering to offer its Master's degree to a cohort of 20 students dispersed on West Hawai'i (Big Island), Maui, Molokai, Kauai and rural O'ahu. A tenure-track faculty line in *Assistive Technology and Distance Education* was created, and Dr. James Skouge (one of the present authors) was hired. A 40-credit Special Education Master's degree distance

education program was initiated Summer 2003 with an enthusiastic faculty and student cohort, all acting on faith that the program could succeed.

This paper is written four years later. Most of the initial cohort has now graduated and the special education department now integrates distance education into many course offerings, including accommodations for students who are Deaf and hard-of-hearing. It is this story in particular that we would like to chronicle; because it has been both a “challenge” and “opportunity” to explore multimedia to enrich the learning opportunities for all of our students.

### **Theoretical Framework**

A brief discussion of the theoretical basis is needed to put the Special Education department’s distance education experience into perspective. The theoretical framework for this paper is grounded in constructivism combined with the concept of universal design.

Jonassen, Davidson, Collins, Campbell and Haag (1995) contend that learning can be best facilitated by designing and implementing constructivist tools and learning environments that promote social negotiation of meaning and dialogue among learners. Consequently, they suggest four constructivist attributes for building learning systems: (a) context, (b) construction, (c) collaboration, and (d) conversation. Context refers to the “real world” setting in which learners perform tasks that are as closely related to the real world as possible. Different “real world” features that might be replicated in a learning environment include the physical, organizational, cultural, social, and political issues that are relevant to the application of the knowledge being learned.

According to Jonassen et al. (1995), construction of knowledge is the “result of an active process of articulation and reflection within a context.” Learning can be best facilitated when learners can create linkages between their own experience and learning materials and make sense of them. Constructivist learning environments allow learners or groups of learners to create meaning from what they experience rather than “learning” the teacher’s understanding of that experience or content. Collaboration among learners helps them to develop, test and evaluate their ideas with each other. Learners are able to develop new and modify their own understanding of an experience or content by the sharing of the multiple perspectives of their peers.

Seaton (1993) argues that collaboration should be the focus of constructivist distance learning activities. Conversation is vital to collaboration. Learners need to converse with each other to plan, collaborate and create meaning together. This is critical for distance learning since communication is facilitated predominantly through online exchanges.

Given that learning occurs in a process of communication between people, students must be willing and able to engage in such communication. Physical and perceptual disabilities may make it difficult for some students to participate in online communication, especially when it occurs in a synchronous environment. According to Mason (1998), “synchronous

communications promote motivation and group cohesion, as well as providing good feedback, supporting consensus and decision making”. While synchronous communication provides opportunities for spontaneous interaction among learners, it requires linguistic agility and fast reaction, and thus presents special challenges for individuals with disabilities.

According to Schmetzke (2001), there is very little research on the obstacles that people with disabilities encounter in online distance education. Using Bobby, a web site accessibility validation tool, Schmetzke (2001) reviewed 219 distance education web sites and determined that only 15% of distance education home pages were free of major accessibility problems. Similarly, a study by the National Center for Education Statistics (2003) indicated that although 95 % of 2- and 4-year institutions offering distance education courses use web sites for course delivery, only 18 % of these sites ensured accessibility to a major extent.

While the concept of barrier-free or universal design, which originally focused on the removal of architectural barrier preventing wheelchair users from entering buildings and using their physical facilities, has been expanded to many design disciplines, it has not been widely applied to the design of online distance education (Burgstahler, 2002). "Universal design" is defined by the Center for Universal Design (1997) at North Carolina State University as "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." This paper contends that applying universal design principles to online distance education, specifically to synchronous communication, will make learning accessible to all students.

In the next section, we shall identify the technology tools and skills that were employed by the Special Education department for distance education.

### **Exploring technologies for synchronous and asynchronous communications**

From the outset, the special education faculty envisioned our courseware to include both synchronous (“real time” communications) and asynchronous elements (“any time, any place” communications). As in our “on campus” classrooms, we wanted to be able to engage in *oral dialogue in real time* with our distance education students, including shared videos and *Powerpoint presentations*. In the beginning, this demand for real time and multimedia communications pushed us beyond the limits of existing technologies. Depending upon the preferences of individual faculty persons, we explored numerous “venues”, in various combinations.

- WebCT for course management, PDF downloads, e-mail and threaded discussions
- Audio-narrated *Powerpoints* (compressed with Impatica) - for Internet viewing;
- Video-narrated *Powerpoints* (via Tegrity Weblearner) - for Internet streaming;
- Hawaii Interactive TV and Polycom – accessible at UH studios
- Multimedia CD’s (designed with Lectora), audio CD’s and video DVD’s - delivered via U.S. mail
- Telephone conferencing

### **Discovering Elluminate Live!®**

In Spring 2006, we were introduced to a new synchronous audio web conferencing system called *Elluminate*. This software (in combination with WebCT and audio CD's and video DVD's) generated widespread enthusiasm among faculty and students, alike. Without requiring "face to face" training or equipment upgrade (except perhaps a headset-microphone), learning communities immediately became engaged in real time communications, including shared *Powerpoints*, interactive voice and text "chat." In May 2006, we convened a statewide conference "showcasing" our student's Master's projects, utilizing *Elluminate* to include our neighbor island participants. By projecting the *Elluminate* interface; amplifying the speakers, and employing wireless microphones, our "distance" students were able to present their *Powerpoints* and dialogue interactively with audiences gathered at the COE. Could we ask for more? It was as though we breathed a collective sigh of relief that finally we could meet and dialogue in a "virtual space" much like what we expect in our brick and mortar classrooms. The only missing element was "video" – we could neither see our speakers nor view their videos: the negative implications of which would soon be felt when we embraced the challenge of including the Deaf community. \*In fairness to *Elluminate*, the software did permit web cam and video sharing, but in rudimentary form.

### **Embracing a Deaf Education cohort**

In 2004 our department inaugurated its first ever Deaf Education Master's degree, for a student cohort that included both "hearing" and Deaf individuals, with several residing on neighbor islands. The language of instruction for the cohort was a mix of English language and American Sign Language (ASL); and although we were gaining confidence that we could transmit English communications, we were far less prepared to transmit ASL which was visual. The sections that follow describe our experiments with videoconferencing (VTC) technologies and "real time" captioning, both of which have required considerable investment in training, support and equipment upgrades.

#### *Setting the groundwork for distance education for Deaf students*

In Spring 2006, Dr. Judy Coryell (the Director of the Deaf Education project) undertook several steps to lay the groundwork for a distance education component, including

- "creative budgeting" to allow all students in the cohort to purchase MacBook Pro laptop computers with built-in web cameras; and
- enrolling the O'ahu-based students (the majority) in a Saturday morning technology class taught by Dr. Skouge, aimed exclusively at educational technologies appropriate for Deaf education (including videography, photography, multimedia and distance communications).

*“Four Point” Video Teleconferencing: Summer Session One 2006*

It was within this Saturday morning “venue” that the cohort began to “get serious” with the technology, with several students emerging as “tech savvy” innovators and risk takers. Apple Computer had just announced an upgrade to its *iChat* software to permit simultaneous telecommunications across four “remote” points. This represented a significant step-up in VTC technology, which heretofore had been restricted to “point-to-point.” Given this upgrade, we envisioned a network including two video “sources” broadcasting from our COE classroom on O’ahu; and one video source each in Hilo and Maui.

The network was put to the test during the Summer Session One 2006. The set-up included the following:

- An ASL interpreter positioned herself in front of a web-cam equipped, *iChat* enabled laptop, interpreting all oral classroom communications (from instructor and students);
- Furniture was arranged in a “U-shape” with instructor at the front and students sitting in a half-circle, with a digital video camera, mounted on tripod, located in the center.

The digital video camera was connected via a 20-foot “firewire” cable to a second *iChat* enabled laptop. Unlike a web cam which is in a “fixed” position, the video camera could be “panned” and “zoomed” to include the instructor, her screen projections, and any student audience members.

- The Deaf students on Maui and Hilo both positioned themselves in front of their web-cam, *iChat* enabled laptops.
- The 4 video sources were displayed on “quadrants” on the laptop screens, with one of the laptops projected onto a screen in the COE classroom; thus permitting the O’ahu-based instructor and students to see the neighbor island participants.

It was a complex arrangement, requiring 2 paid student assistants (one operating the camera; and the other trouble-shooting the transmissions). The challenge was intensified by the fact that the set-up time before each classroom session was restricted to half an hour, due to tight scheduling of room access. Needless to say, there was a flurry of activity immediately prior to each classroom session.

Although there were technical difficulties and human errors, the experiment was generally successful. The faculty member maintained her sense of humor; and the two Deaf students completed the course without significant trauma.

Lessons learned include the following:

- Utilize “hard wired” Ethernet connections (wireless Internet connections are not as dependable for videoconferencing);
- Insist that Deaf participants at remote sites be “partnered” with a hearing person at the same location who can use a telephone to problem-solve with the COE technician;
- Produce a “screen capture” of the transmission to be burned to DVD’s and distributed as “hard copy” to students for review purposes.

Most importantly we learned to maintain a healthy sense of humor, recognizing that video transmission over the Internet is still “edgy” when interfacing multiple points on a regular schedule with little margin for error.

### **Elluminate interfaced with American Sign Language: Summer Session Two 2006**

In July, our Deaf student on Maui enrolled in yet another “online” special education course. This time, however, the course was configured differently and she was the only Deaf participant. All students were dispersed throughout the state, with the courseware delivered *asynchronously* via WebCT and DVD videos, and *synchronously* via *Elluminate*. The WebCT content included articles, e-mail and threaded discussions – all of which were “text based” and therefore accessible. The DVD’s were closed-captioned. The *Elluminate* sessions, however, posed a significant challenge, as they supported a continuous stream of voice content (lecture and discussion) accompanied by *Powerpoints* and text chat. How was the voice content to be made accessible?

In face-to-face classrooms, the most common accommodation (at least in Hawaii) is ASL interpretation, in which an ASL interpreter attends each class session to interpret two ways (voice to ASL; and ASL to voice), so that the Deaf student can both understand and be understood. An alternative accommodation that is now becoming viable because of the Internet is “real time captioning” in which a typist (utilizing technology similar to court recording), listens-in via telephony and transcribes the audio material in “real time”, transmitting the text in a “chat window” to the Deaf student’s laptop, allowing him or her to read a dynamic transcription. In this scenario, the transcriptionist does not need to be physically present in the classroom. He or she can listen, transcribe and transmit from any place supported with phone and Internet access.

Given these two choices for accommodations (both of which were new to us within the context of “distance learning”), we convened a series of planning meetings prior to the first day of class to identify an intervention strategy. In attendance were the course instructor, the coordinator of the Deaf cohort, a counselor from the disabled student services, and a technology trainer and assistive technology specialist with the COE

distance education office (Adam Tanners, co-author of this paper). With input from the Deaf student, it was determined that ASL interpretation was the preferred accommodation.

A second consideration involved determining how the ASL services should be delivered. Should the interpreter go to the student's home on Maui to interpret the *Illuminate* broadcasts? This idea was unsatisfactory because ASL interpreters were in short supply on Oahu's neighbor islands. Instead, Adam suggested that we provide an Internet transmission using *iChat* (utilizing techniques similar to what we had honed earlier in the summer). This way, the interpreter could be physically located in the instructor's office at UH Manoa, transmitting via webcam. The suggestion was adopted and, in fact, proved advantageous on several counts, including the fact that the Deaf student could see the interpreter, the chat screen and the *Powerpoint* "packaged" on her computer screen – facilitating her comprehension. She also actively contributed to the oral discussion by signing to the interpreter who, in turn, "voiced" for her over the network. All in all, it proved to be a creative, workable solution.

Lessons learned included the following:

- Having both the interpreter and the instructor in the same room, facilitated communication, as the interpreter could see the instructor's body language.
- Both the *Illuminate* and *iChat* applications ran together without conflicts or "drop outs", with the windows arranged side-by-side permitting access to the video window (ASL), the *Powerpoint* slides and the text chat window.
- An "off the shelf" headset-microphone was satisfactory for the Interpreter allowing her both to "listen" and "voice" without distraction.
- Having a technician physically present during set-up and connection (and "on call" for the duration) was essential.

### **Illuminate interfaced with "real time captioning": Fall Semester 2006**

In August we faced yet another opportunity to explore an *Illuminate* accommodation. At this time, a new student who was *hard-of-hearing* had enrolled in our Master's degree program. Her disability was more "invisible." She wore hearing aids and actively participated in face-to-face classes without accommodations. She could understand oral communications and be understood in return. In fact, she did not speak American Sign Language, having grown up fully included in the English speaking world.

What we learned, however, was that her communication skills were significantly compromised in the *virtual classroom of Illuminate*. The "acoustic world" of the *Illuminate* classroom was entirely different from face-to-face classroom participation. In the *Illuminate* classroom, the student listens and speaks using a headset-microphone -

without access to the many non-verbal cues (lip reading, facial expressions, gestures, audience reactions) made available with physical presence. In short, after the first *Elluminate* session, we were abruptly notified by the student that she required an accommodation. She simply “could not understand” the Internet telephony. We were caught by surprise. The next *Elluminate* session was scheduled in a matter of days, and the only solution we could imagine was “real time captioning.” But, could we make it happen in Hawaii on short notice?

The short answer is that we did succeed. It took two tries however; with many calls to mainland consultants. Real time captioners were not available locally, and proved difficult to locate even on the mainland, given the requirement that they had to interface their software with *Elluminate*, which for most was an unwelcome challenge. The *Elluminate* interface included a “real time captioning” window which was touted in its manual as easy to use. This certainly did not prove to be the case. Adam Tanners spent many hours “networking” technicians with captioners to realize success. His work did pay off, however. By the third session, real time captioning was scrolling in a text box throughout the 2-hour session, with many of the students (without disabilities) accessing the dynamic transcript as well.

Lessons learned included the following:

- Be prepared for surprises. In this case, the student herself did not realize the need for an accommodation until the last minute.
- Work closely with student disabled services, realizing that these accommodations cost time, energy, commitment and money.
- Protect the faculty member as much as possible from having to deal with the technicalities. It is enough that the faculty member is worrying about curriculum and instruction. \*In our case, Adam was physically present in the professor’s office throughout the *Elluminate* sessions (communicating by text chat and telephone as needed).
- Have a back-up plan. A significant advantage to “real time captioning” is that it produces a transcript that can be shared with any students who may need to review the material.

### **Conclusion: “universal design” and the “value added” factor**

The UH College of Education actively supports distance education outreach. This paper focused on initiatives within the Department of Special Education, where we are actively engaged. It is our experience that “brick and mortar” curriculum and instruction simply cannot be re-packaged and exported to “virtual” classrooms. Distance education changes the way people teach and learn. Faculty must take risks; and they must be supported with equipment, training, mentoring and role modeling. The UH College of Education is to be commended for providing all of these levels of support, under the leadership of the

Department of Technology and Distance Programs, including Dr. Paul McKimmy (Director), Dr. Peter Leong (Instructional Designer) and Mr. Adam Tanners (Faculty Mentor for assistive technology and distance communications).

Even with the best laid plans, however, surprises and challenges abound. In particular, our department has embraced the inclusion of students who are Deaf or hard-of-hearing. The accommodations that we described were “invented” through trial and error – sometimes at the expense of the faculty member and the students. We learned, however, that persistence pays; mainstream technologies can be universally designed and accommodated; and that students and faculty alike embrace distance education as “value added” to our program.

On a final note, many of the distance education technologies now impact our “face to face” instruction. WebCT, for example, is ubiquitous across the curriculum. We publish HTML multimedia and DVD videos that are shared with our on campus students. Video conferencing and Skype telephony are being employed to invite “virtual” guests into our classrooms. Podcasting is emerging as a viable tool to share lectures. Even *Elluminate* is being employed to permit students and faculty to meet “outside of class” for discussion and planning. The distinctions are crumbling between “real” and “virtual” classroom spaces, as perhaps should be expected.

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