AC 2007-2429: WEB-BASED DISTANCE LEARNING SYSTEM FOR OPPORTUNITIES FOR HEARING IMPAIRED STUDENTS

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Web-Based Distance Learning System for Opportunities for Deaf Students

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Abstract

Various models of distance learning are being used for deaf students at post-secondary levels.   The web-based distance learning that enhances classroom instruction, synchronous videoconferencing that supports staff development, admissions and recruitment efforts, and desktop videoconferencing are valid modes for deaf student. Included in the discussion are recommendations for innovative uses of distance learning with deaf students, and the opportunity for continuing this discussion through the use of distance learning technologies.

Reasons for using multimedia tools in remote education system (Pedagogical):
The numbers given figure below summarizes the reasons as:

- **The trainees learn 1060 items they read**
- **The trainees learn 2060 items they hear**
- **The trainees learn 3060 items they see**
- **The trainees learn 5060 items they see and hear**
- **The trainees learn 7060 items they experience**
- **The trainees learn 9560 items they teach others**

These figures are compared to a few education points (of 12000 cases); however, the above-mentioned subjects are a case study in explaining status of educational technology.

Distance learning offers new and continuing educational opportunities for students throughout the world. New technologies are modifying traditional delivery systems of distance learning by offering new means of communication and interaction. Sometimes students can access this type of education readily with equipment and software they already own or can readily locate. It

is important that deaf students who may be potential distance student become involved in the development of these learning materials and make use of the increasing distance learning opportunities.

Students, developers, and faculty need to insure accessibility and ease of use of distance learning technologies. For this to occur, we should become familiar with examples of how various distance-learning approaches are being used at post-secondary levels and have in place a forum to share our experiences with one another.

In this presentation, we focus on two approaches to distance learning and their relationship to deaf student: (1) web-based distance learning that enhances classroom instruction, (2) synchronous videoconferencing that supports staff development, admissions and recruitment efforts.

What is Distance Learning?

The PWUT (Power and Water University of Technology) uses the term Distance Education to include Distance Teaching, the instructor's role in the process, and Distance Learning, the student's role in the process.

Distance Education takes place when teachers and students are separated by physical distance; and technology (e.g., voice, video, data, graphics, print), often with face-to-face communication, is used to bridge the instructional gap. Distance Learning (DL) can provide education for a variety of populations, who may not be otherwise served, such as:

- students disadvantaged by limited time, distance or physical disability;
- adults needing a second chance at a college education; and
- workers needing to update their knowledge base at their places of employment.

Distance learning can complement or supplement other learning opportunities. Distance learning is an evolving process. Four key features of DL can be summarized as follows:

1. Separation occurs for a significant portion of the instructional process, and for teacher and student in space and/or time.
2. Media is used to unite the teacher and the student, and to carry content.
3. Communication occurs between teacher and student, and among students.
4. Control is often determined by the students, and not by the distance instructor.

Main advantages of implemented remote education system

- Decrease in the need to establish educational spaces and at the same time, quantity development of education
- Better use of professionals and specialists of each field as well as lowering educational cost per capita with due respect to centralized use of educational facilities
- Saving in time and costs for in-bound and out-bound trips (instructors and lecturers of educational courses)
- To decrease depreciation of educational inputs, and to lower welfare costs (accommodation, food and reception)
- Standardization of the contents of educational courses and tests
- Generalization of education issue for great regions, which lack any educational facilities.

Web-based Learning and the Deaf Student

Web-based Distance Learning Can Enhance Classroom Instruction.

The advantage of web-based distance learning is its "friendliness." Many students and teachers are already familiar with the Internet, already use it to keep in touch with friends, family, and/or colleagues. For these people, it is a natural extension to use these same tools for teaching and learning. For example, when teens and young adults go to conferences, their

email addresses are centrally posted so they can continue their conversations on Internet chat areas or through IMing (Instant Messaging) when they return home after the conference.

The hardware/software for Web-based DL is commonly found in homes today. About 70 million homes in the US are equipped with personal computers and Internet connections. Additionally, students have access to this equipment at public libraries and Universitys in most communities.

Distance Learning on the web, when interaction is provided, may incorporate: person-to-computer interaction and/or person-to-person interaction. Person-to-computer interaction is between student and a software program. The student (user) interacts with a computer program. Person-to-person interaction occurs when the student has an opportunity to interact with other student and/or moderators (leaders).

Person-to-computer is preprogrammed interaction that occurs between student and a software program. Examples include web forms; on-line course outlines/notes; and on-line quizzes.

The student interacts with a computer program and receives feedback from a computer. The student may or may not receive periodic feedback from a teacher. At this point, the interaction moves beyond preprogrammed interaction. Person-to-person interaction brings familiar features of the classroom to the Internet. Examples include conferences, chats, and online group projects. Key features of person-to-person interaction are:

1. The users (students) interact with moderators (leaders or teachers).
2. The moderators may serve as models.
3. The users (students) interact with other users (students).
4. Everyone can be an equal.

In this presentation, we focus on person-to-person interaction. These interactions can occur whenever it is desirable for the participants or at prearranged times.

How Should You Introduce Web-based Distance Learning?

Another component in planning is to determine the computer skills and comfort of your students so that all students can access distance learning confidently and comfortably. Some students will benefit from an introduction to DL in which the parallels between classroom learning and DL are clearly modeled. These students will profit from a teacher-led transition between a low-technology classroom and a high-technology classroom (Figure 1).
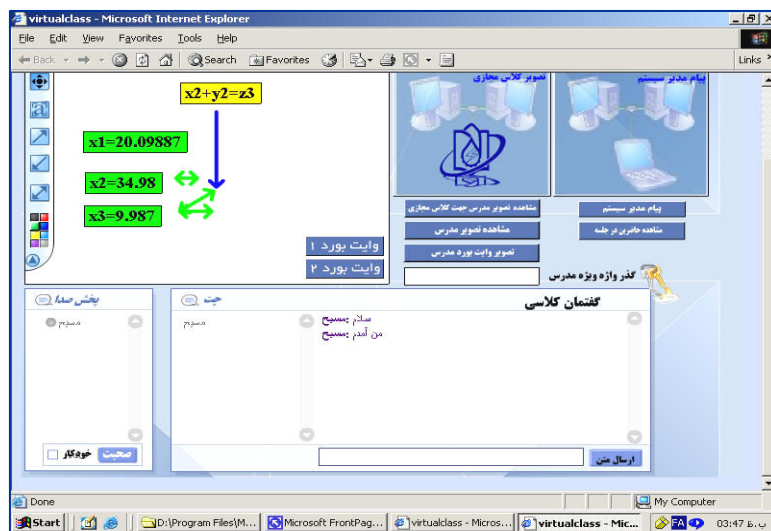
Figure 1. Transition between low-tech and high-tech classrooms

Most students will find DL more comfortable when a self-learning environment is modeled. This type of scaffolding enables students can make the move from supervised or guided learning to independent or volitional learning with greater confidence (Figure 2).

Figure 2. Transition between supervised and volitional learning.

How Can You Achieve Person-to-person Interaction in Web-based DL?
Asynchronous communication can occur at any time; the participants do not all need to be present at the same time. Therefore, asynchronous communication accommodates students in different time zones, as well as students with different study schedules and job responsibilities. Asynchronous communication is possible through: email, mail lists, newsgroups (Usenet), and message boards.
Synchronous communication requires concurrent participation of all parties involved. Typically, the communication is available to participants only as it occurs. The participants need to be attending to the conversations or they will miss information. This form of communication more closely resembles the classroom environment. Visibility is crucial because information is not repeated unless a participant specifically asks for repetition. Synchronous communication can be achieved by text, audio, and video. It can occur for a group or on a one-to-one basis. Synchronous communication is possible through: chat rooms, instant messaging, net conferences, and net phone.
Distance learning teachers should consider the purposes of the different synchronous and asynchronous interaction possibilities in order to select that which can best meet their particular needs. (See tables 1 and 2.) For example: a discussion board can be used to:

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- provide a discussion area for homework, tests, reading, conversing with the professor;
- provide information about course materials; or
- achieve both of the above purposes.

There are further considerations Distance Learning instructors might wish to determine when implementing synchronous interactive web sites. These include:

- Does the instructor have the necessary time out of class to devote to live-person synchronous interaction?
- Are the students are able to get together (log on) at common times?
- Can the server handle all of the anticipated users concurrently?

Some online examples of interactive technologies for courses include:

1. Web Forms: (all sites accessed April 2000)
   - Using web forms and email for assignments: http://www.rit.edu/~kecncp/leaders.htm;
   - Using MS Word forms for research projects: http://www.rit.edu/~kecncp/160/cc-part-1-2-research.doc;
2. Message Boards at NTID
   - Message Boards are being used in several courses for Deaf students at NTID. I have found them very useful for short writing assignments and for stimulating peer review of students' work. College Writing -- http://www.rit.edu/~kecncp/discus (moderated by KEC)
   - Other professors have put them to use for job interview practice situations and for art seminar discussions. Job Search and Freshman Art Seminar --
3. Chat Rooms General Audience:
   - Chat and Newsgroups are online for English second language students.
   - One-on-one software is available from ICUII and from MS Netmeeting. These work adequately for slow signing when each user is seated near a webcam. However, this technology is advancing rapidly; we can expect to see significant improvements soon. http://www.microsoft.com/netmeeting
   - Group chatting software is offered by iVisit and SeeMeHearMe.

To make intelligent decisions about which web technologies to incorporate into DL can be confusing. The development team needs to consider a variety of factors. It seems reasonable to first weigh the advantages and disadvantages for the first decision, that is: Should you use online interaction for your DL project? Once the decision has been made to go with online interaction, the team will need to consider whether to incorporate synchronous and/or asynchronous interaction features. Tables 1 and 2 present some considerations you will need to evaluate in making these decisions.

Table 1. Advantages and Disadvantages of using online interaction

Advantages	Disadvantages
- Interaction provides positive group support. - There is an authentic context for interaction. - Users can decide which issues to initiate and when to participate. - A positive evaluation is achieved when	- Interaction requires an ISP that is up and running. - Users need basic computer skills. - Computers do crash from time to time. - New users and students may feel threatened when topics are too far outside

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other participants understand you. • Motivation is fostered when understanding is achieved. • Self-confidence results when participants have common interests. • These positive outcomes promote a desire to continue learning. • Independence in learning is rewarded. • Users become familiar with questioning strategies for clarification, correction, and expansion of ideas.	of their knowledge areas. • Sometimes users' questions and comments may get few or no responses. • The moderator's role can be time consuming.

Table 2. Similarities and Differences for synchronous and asynchronous online interaction

Similarities

- There is a variety of software; much of it is free and relatively easy to set up.
- Users may never get a direct response to your comment.
- Users may contact many or few suitable conversational partners.
- Users need to know appropriate etiquette and learn some netspeak terms.

Differences

Synchronous	Asynchronous
time-bound conversations	on-going conversations
must arrange a specified time to participate	can drop in any time
can interact only with those presently online	can interact with people not presently online
fast and free-flowing conversation may be hard for second language students to follow (much chat is very informal and relaxed)	slow paced conversation allows more time for understanding and formulating thoughts (more opportunity for formal, thoughtful discussion)
multiple conversations occurring simultaneously may be difficult to follow	conversations are usually arranged by topics
one-to-one (IM) allows for individual conversation	private conversation on a one-to-one basis is impractical
messages are fleeting; can't be referred to later except if saved	messages are permanent for later reference

Videoconferencing and the Deaf Student

What is Videoconferencing?
Videoconferencing is the transmission of image (video) and speech (audio) back and forth between two or more physically separate locations. This is accomplished through the use of cameras, video displays, microphones, and speakers. Videoconferencing can be point-to-point (between two endpoints), or multipoint (combining two or more endpoints into the same "conversation").
Videoconferencing is live, synchronous, and closely resembles a traditional classroom setting. It uses compressed video over T1 or ISDN lines to send and receive audio and video signals.

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Why Use Videoconferencing?

Videoconferencing could be applied in two general situations: a) those where you are already able to communicate with someone who is not physically nearby, but wish that communication could be richer, and b) those where you wish to access or communicate to an area that may or may not be nearby but is limited by situational or physical restraints. In these situations, communication is already occurring, but could be made more effective, or less expensive via videoconferencing.

General Uses of Videoconferencing in Education

For meetings that already regularly take place and require-face-to-face communication, videoconferencing can substitute for the actual physical presence of remote participants. This reduces travel costs as well as travel time and makes meeting attendance more convenient and likely to occur. Videoconferencing provides remote participants with face-to-face familiarity that comes with physical presence, including facial expression, body language, and eye contact. Other examples of videoconferencing in education are: collaborating with documents and applications over a network, large and small class lectures, presentation planning, proposal preparation, student projects and scientific research.

What Basic Hardware Is Needed For a Videoconferencing Setup?

Videoconferencing terminals must have a few basic components: a camera (to capture local video), a video display (to display remote video), a microphone (to capture local audio), and speakers (to play remote audio). In addition to these components, a videoconferencing terminal also includes a codec ("Compress /Decompressor"), a user interface, a computer system to run on, and a network connection. Figure 3 depicts the hardware needed in a videoconferencing setup. Each of these components plays a key role in determining the quality, reliability, and user-friendliness of the videoconference, and the videoconferencing terminal's suitability to particular purposes.

Figure 3. Components of a videoconferencing setup.

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What are the cost factors?

A basic videoconferencing setup as described above would cost approximately $55,000 for the hardware. Other costs to be considered would be the monthly rental of an ISDN Line, toll charges for individual calls (the party who places the call, pays for the call), and an annual warranty plan. Costs for technical service and instructional personnel would also have to be figured into the cost of videoconferencing.

Videoconferencing Scenarios at NTID

NTID has been exploring the use of videoconferencing for the past three years. The following are some examples of how videoconferencing technology has been applied:

- An NTID panel of students connects with the Greater Los Angeles Council on Deafness (GLAD) and Gallaudet to learn about admissions and recruitment
- Japanese faculty from Tsukuba College of Technology connect with NTID as part of a grant that explores software applications as applied to deaf education (Figure 4). In Japan, ISDN technologies are more popular, are often found in the home, and are used for Internet access and telecommunications.

Figure 4. Japanese faculty connect at NTID.

- A French student attending RIT for a degree in fine arts uses videoconferencing capabilities to connect with students and teachers in Paris at SPEOS for progress reports.
- An NTID faculty member teaches interpreting students in eight different states.
- The Director of Product Development Program at RIT conducts all day conferences with MIT (Boston) and University of Detroit to collaborate on the design of a new courses in Leadership and Product Development.

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Conclusion

Is Distance Learning Effective?

Distance Learning can be as effective as traditional instruction when the methods and technologies used are: 1) appropriate to the instructional tasks, 2) designed to include student-to-student interaction, and 3) able to provide timely teacher-to-student feedback.

What Should Educators of Deaf Students Do To Prepare For Distance Learning?

Educators of Deaf students have a definite advantage when it comes to Distance Education in that they already know how to adapt teaching for visual learning. When these teachers adapt a course for distance learning, they already have a large collection of visual presentations, such as tables, figures, and illustrations to depict concepts. This greatly simplifies the development effort. When planning for distance learning educators of Deaf students should plan to: (1) focus students' attention on visual presentations, (2) illustrate key concepts using tables, figures and other visual representations, (3) encourage interactivity, (4) allow for student group work, and (5) be prepared for technical problems.

However, educators of Deaf students may work in environments where they do not have many colleagues who also teach Deaf students. The last part of this presentation was devoted to sharing ideas for distance learning among the participants. An online Distance Learning network for these educators would allow them to share their ideas and experiences, ask questions, and get information from their colleagues. As a follow-up to this presentation, we propose to establish a web site for such a network and have collected names of interested participants.

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