

Document Cover Sheet

- Title – **Determining the Feasibility of Using Synchronous Collaborative Distributed Learning for Radiation Protection Training**
- Assigned Number – **UCRL-CONF-204762**
- Authors – **D. D. Sprague, J. Basore**
- Author Affiliation – **Hazard Control Department / Safety, Education and Training Section / Lawrence Livermore National Laboratory**
- Presentation – **7/12/04 at the 49th Annual Meeting of the Health Physics Society, Washington D.C.**

This document was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor the University of California nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or the University of California, and shall not be used for advertising or product endorsement purposes.

This work was performed under the auspices of the U.S. Department of Energy by the University of California, Lawrence Livermore National Laboratory under Contract No. W-7405-Eng-48.



Determining the Feasibility of Using Synchronous Collaborative Distributed Learning for Radiation Protection Training (UCRL-CONF-204762)

D. D. Sprague, J. Basore

sprague6@llnl.gov

925-422-2340

Hazards Control Department
Safety, Education and Training Section
Lawrence Livermore National Laboratory



Topics

- Radiation protection training needs
- Existing LLNL training methods
- Advantages and disadvantages of existing methods
- A new approach – Synchronous Collaborative Distributed Learning (SCDL)
 - Software and hardware technology required
 - Instructor skill set required
 - Experience and lessons learned
 - Advantages and disadvantages
- Conclusions

Radiation Protection Training Needs

- Meet 10 CFR 835.901 training requirements
- Have capability to train large numbers of staff
- Make training safety effective (improve safety environment)
- Make training cost/time effective (student time is a big issue)
- Make training as interesting as possible
- Make training versatile to meet specific audience type

Existing Training Methods

- Lecture based training
- Single station or server based CBT
- Web-based CAI (computer aided instruction)
- Read-and-sign booklets (GERT, etc.)
- Briefings and tail-gate training

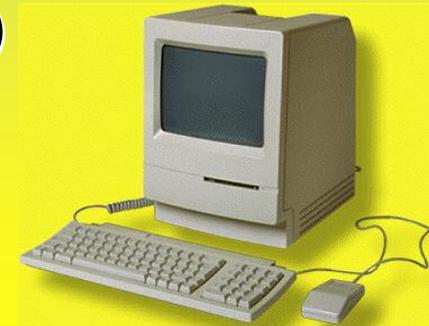
Lecture Training

- With the right material and instructor, probably the “best” (most effective) training method
- Allows instructor contact for content clarification
- Conduit between HCD safety professionals & users
- Problems:
 - Finding/training the instructors
 - Expense of implementation (student class time)
 - A place to do it (very serious problem at LLNL)
 - Hard to train large numbers
 - Instructor fatigue (if large number of sessions taught)

CBT

(single station or server based)

- Limited capacity – due to hardware, software and licensing requirements
- Poor value – very expensive because it is usually leased rather than owned
- Inflexible – commercial products too generic (or quality too poor) to meet individual site needs
- Static – proprietary software/content make it difficult or impossible to change (legal issues)
- **HCD/SETS is phasing out all CBT**



Web-based CAI



- Unlimited capacity – web browser based (should) make it hardware/software independent
- On demand classes available 24/7 meet user needs
- Good value – expense almost all found in initial development, but you own it, so cheaper over time
- Flexible and kinetic – available software and your own content allows easy, quick changes (no legal issues) to meet your individual needs
- Tracking and record keeping is easy and efficient
- **HCD/SETS is using CAI to replace CBT**



Web-based CAI



- Steep learning curve for Macromedia Flash software
- Software/plug-in compatibility issue with older browsers
- Basic computer literacy required for users
- Reusable/adaptable design for content “object” effectiveness (5 +/- 2 rule of thumb)
- Require appropriate content (text, pictures, video, animation, etc.) to meet target audience(s) needs.
- Record keeping software interface can create problems
- Need for extensive beta piloting prior to release
- No direct instructor contact to address user questions

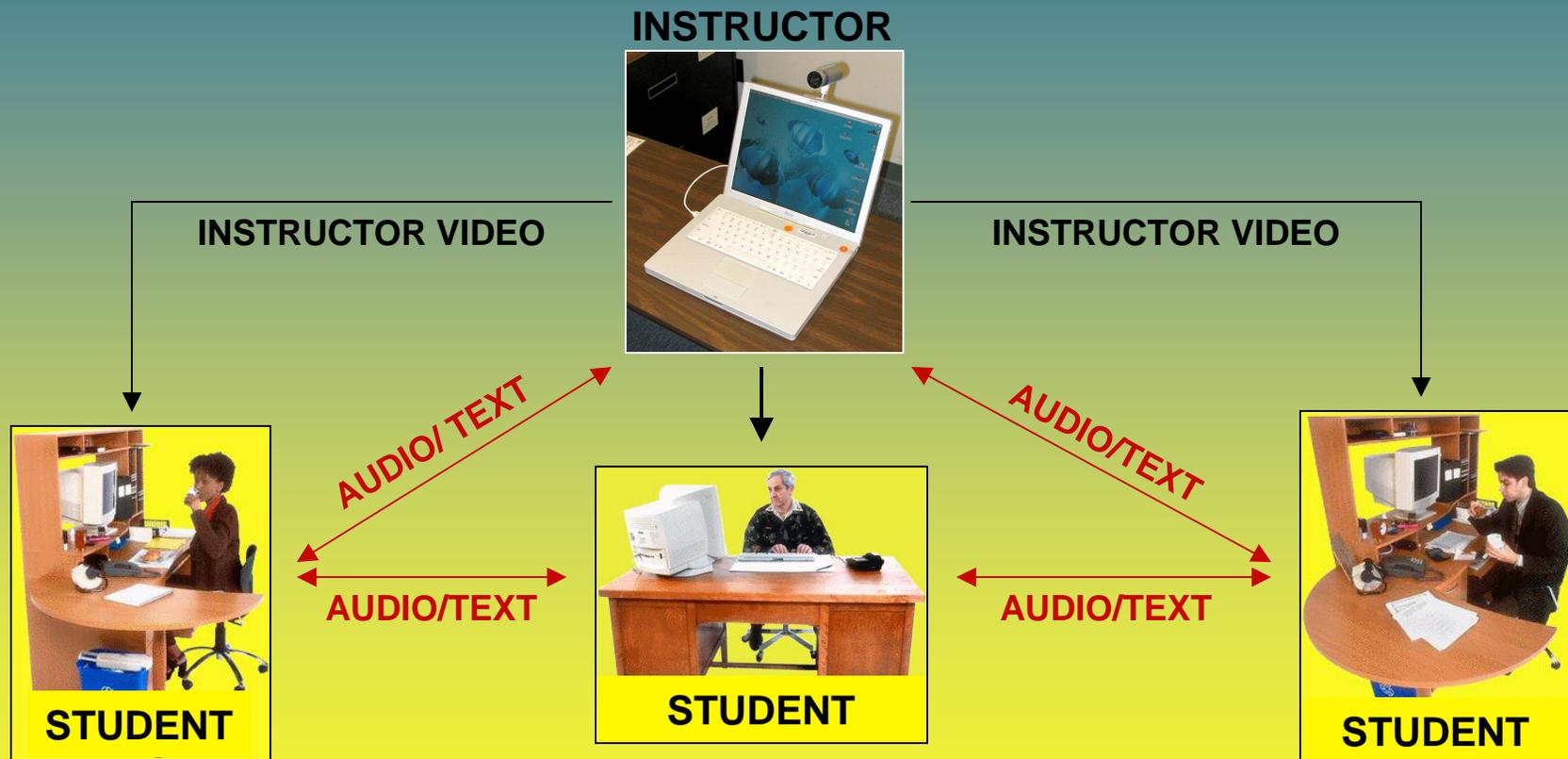
A New Approach – SCDL

(Synchronous Collaborative Distributed Learning)



- One-way video web-based teleconferencing with audio or text “chat”
- Integrates CAI concepts with lecture based training
- Expands capabilities of instructor – virtual “classroom” can be of any size required
- Special hardware/software needed, but cost minimal
- Allows integration of PowerPoint, streaming video, written materials, etc. with instructor lecture – powerful multimedia tool
- Allows course for anyone with web access (no travel costs)
- Compression requires little bandwidth for most applications (some video formats may be an issue)

SCDL Diagram



Audio/Text Chat communication is multi-directional
Instructor Video communication is one-directional

SCDL Disadvantages



- Classes need scheduling (not on-demand like CAI)
- Server license software expense
- Instructor “connection” with students is impacted adversely
- Video bandwidth issue outside of DSL/LAN
- Student participation needs to be monitored
- Instructor needs to adapt new teaching skills to effectively facilitate learning

Instructor Skill Set

- Lecturing to a camera is very different from lecturing to an audience
- The visual student “cues” used by instructors are lost
- Maintaining lecture “flow” is hard without verbal feedback (text chat issue)
- Speed control is critical – need ask the audience for feedback
- Watch your appearance in your feedback window – all those little habits are now on parade



Hardware & Software

- Video camera (USB or firewire, autofocus with microphone)
- Macromedia Flash MX authoring software
- Macromedia Flash Communication Server MX (live webcast, streaming video, server control, etc.)
- Microphones for students (optional, can use text chat)
- Server minimum of 500 MHz Pentium III with Windows 2003 Server or Linux 7.3
- DSL/LAN (1 Megabit Ethernet)



Student Log-in Screen

Login to RGD Safety

First Name **Last Name**

Employee Number

Please fill in the form fields and then Login

Allows tracking of student attendance/testing

Flash Player Loading

The screenshot shows a web browser window displaying a presentation from Lawrence Livermore Lab. The presentation is titled "Introduction To Radiation Safety" and is part of "Module #1". The main content area shows a slide titled "HS6988 Radiation Generating Device (RCD) Safety" with a video player. A "Macromedia Flash Player Settings" dialog box is open, asking for permission to allow the website to access the camera and microphone. The dialog box has "Allow" and "Deny" buttons. The presentation interface includes a navigation bar with "ASK A QUESTION", "INSTRUCTOR INFO", "GET HELP", "RESOURCES", and "EXIT". The instructor's name is "Dewey Sprague". The student list shows "James_teacher". The slide selector shows "Slide 1" and a list of slide topics: "Value Bubble", "Attracting", "Engaging", "Retaining", "Learning", and "Relating". The presentation also features a volume control slider and navigation buttons for "BACK" and "NEXT".

Instructor Screen

The screenshot shows the CoLABorate interface for an instructor. At the top, it displays 'Lawrence Livermore Lab' and 'CoLABorate'. Below this is a navigation bar with 'ASK A QUESTION', 'INSTRUCTOR INFO', 'GET HELP', 'RESOURCES', and 'EXIT'. The main content area is titled 'Introduction To Radiation Safety' and shows a video feed of Dewey Sprague, a student list with 'James_teacher', and a slide selector. The slide presentation is titled 'HS698 Radiation Generating Device (RGD) Safety' and shows a video of a radiation generating device. The interface includes a volume control slider and navigation buttons for 'BACK' and 'NEXT'.

Instructor image (feedback)

Student list

Slide selector/locator

Volume control

Slide presentation

Slide advance

Student Screen

Click here
to ask a
text question

Instructor
image

Student
list

Click here
to ask a
verbal
question

Lawrence Livermore Lab **CoLABorate**

ASK A QUESTION INSTRUCTOR INFO GET HELP RESOURCES EXIT

Introduction To Radiation Safety

Dewey Sprague

HS698
Radiation Generating Device
(RGD) Safety

Student List

_student

Talk

Collaborate

tery_student: Why are we learning about value bubbles
Judy_student: e business is really great don't you think
James_teacher: absolutely
James_teacher: This chat box is draggable
Barry_student: Coordinate ourselves with using the same information in a number of different ways that can be attributed to extended growth in a very attributable field
James_teacher: Hello
tery_student: What are three of the most important prerequisite tasks that can be implemented in your work area

Module #1

Hello Send

Help
resources

Text
messaging

Conclusions

- Not as easy as originally thought – software and instructor skills take time to develop
- Can increase the number of and size of classrooms without any construction – makes software/hardware cost inexpensive
- Verbal chat function superior to text-based chat for questions – allows for better student/instructor contact
- SETS plans to use this method where instructor or student travel time is an issue



Questions?



5/10/04

20