Classroom Teaching with Collaborative Network Technologies

Chi N. Thai
University of Georgia
College of Agricultural & Environmental Sciences
Biological & Agricultural Engineering Dept.
Athens Campus

Classes Taught & Instructional Needs

- Computer Programming in JAVA (Ugrads).
- Systems Modeling & Simulation (Ugrads & Grads).
- Applied Machine Vision (Ugrads & Grads).
- Characteristics of these classes:
  - Computer intensive.
  - Understanding by "Building" Knowledge.
  - Linked to "What if" Scenarios or "Physical" Experiments.

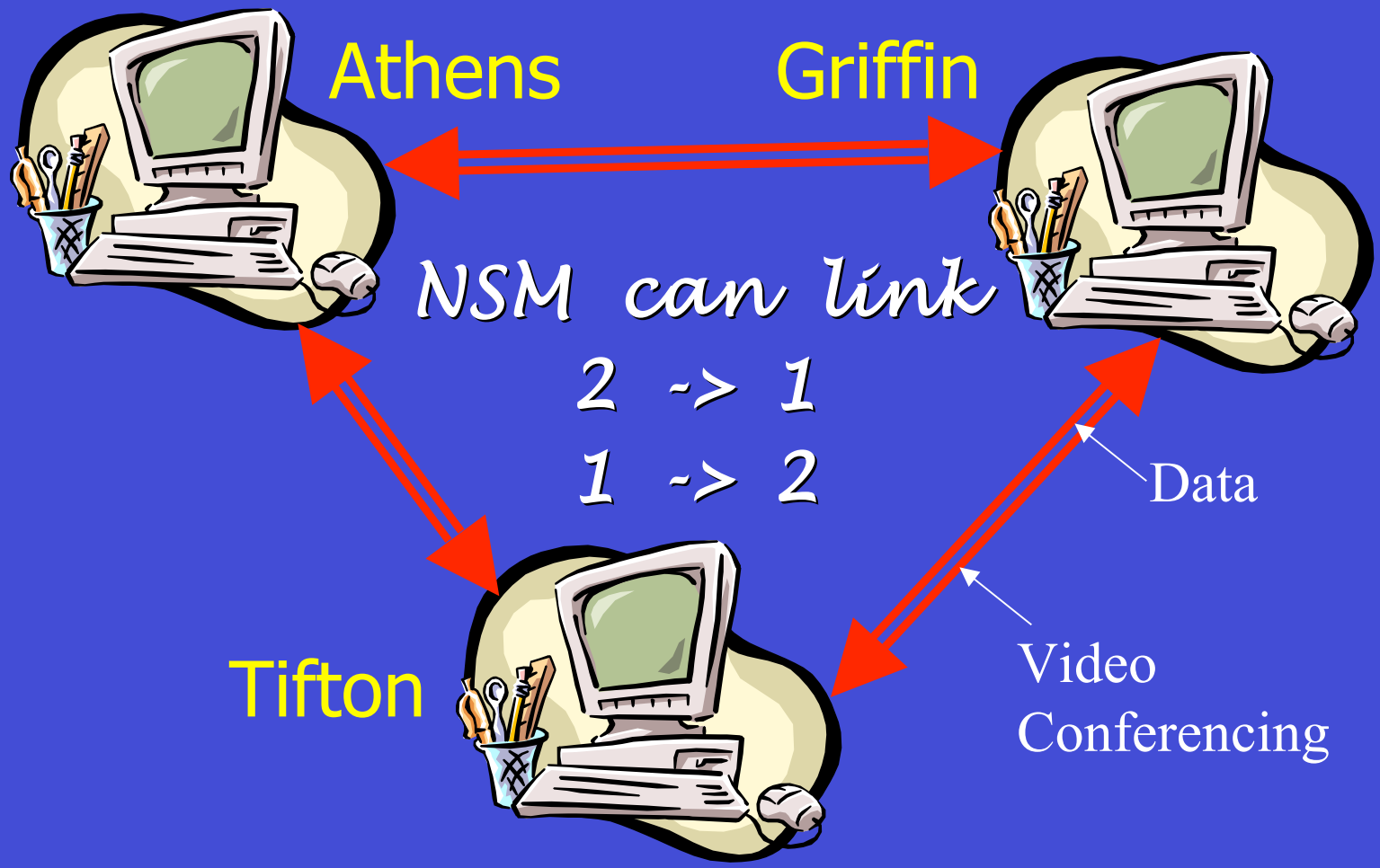
BAE Engineering Education Needs

- More "hands-on" experiential learning for students.
- More "collaborative" activities between teacher-student & student-student.
- More immediate feedback on concepts being discussed or applied in class.
- More involvement of off-campus faculty in teaching students in Athens. Distance & Time are the main constraints.

BAE Approach

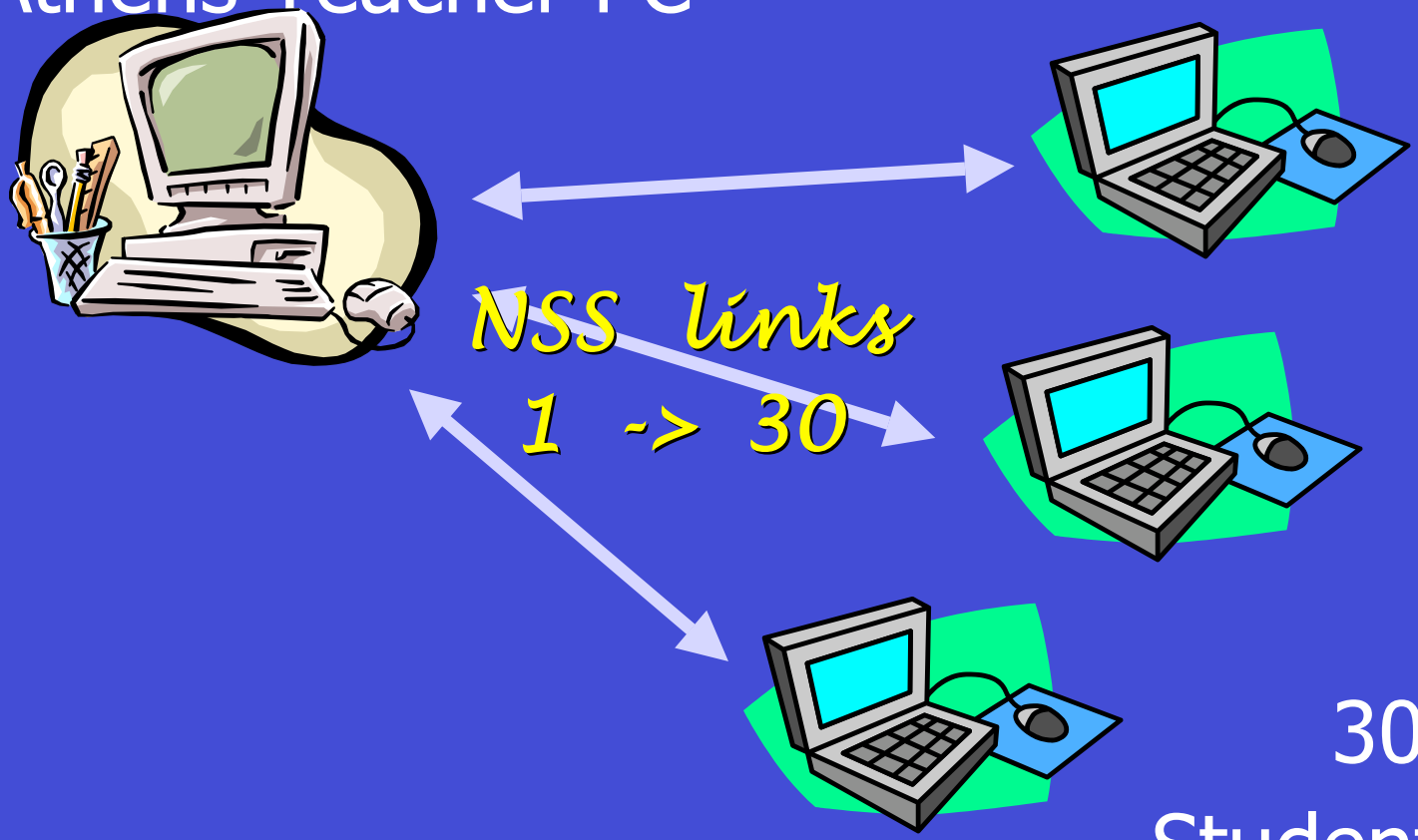
- Combination of Video Conferencing & Network Control technologies to provide as much as possible Real-Time Control & Collaboration between PCs from local sites as well as from remote sites:
  - Room 310 – Electrical & Electronics Lab.
  - Room 219 – Collaborative Distance Education Lab.
- Funded with BAE & CAES funds, UGA Student Tech. Fees & Learning Technology Grants over 2+ years.

Teacher Stations Wide Area Network
(using NetSupport Manager)



Room 219 (Local Teaching Mode)
(using NetSupport School)

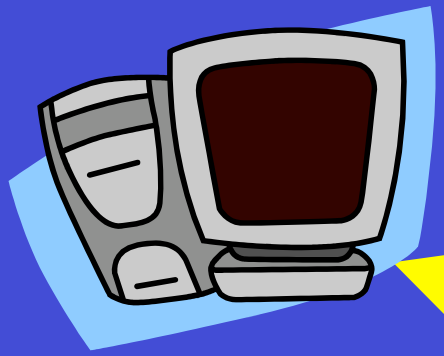
Athens Teacher PC



30
Student PCs

Room 219 (Remote Teaching Mode)

Remote Teacher PC



Minimize Long Distance Ethernet Traffic

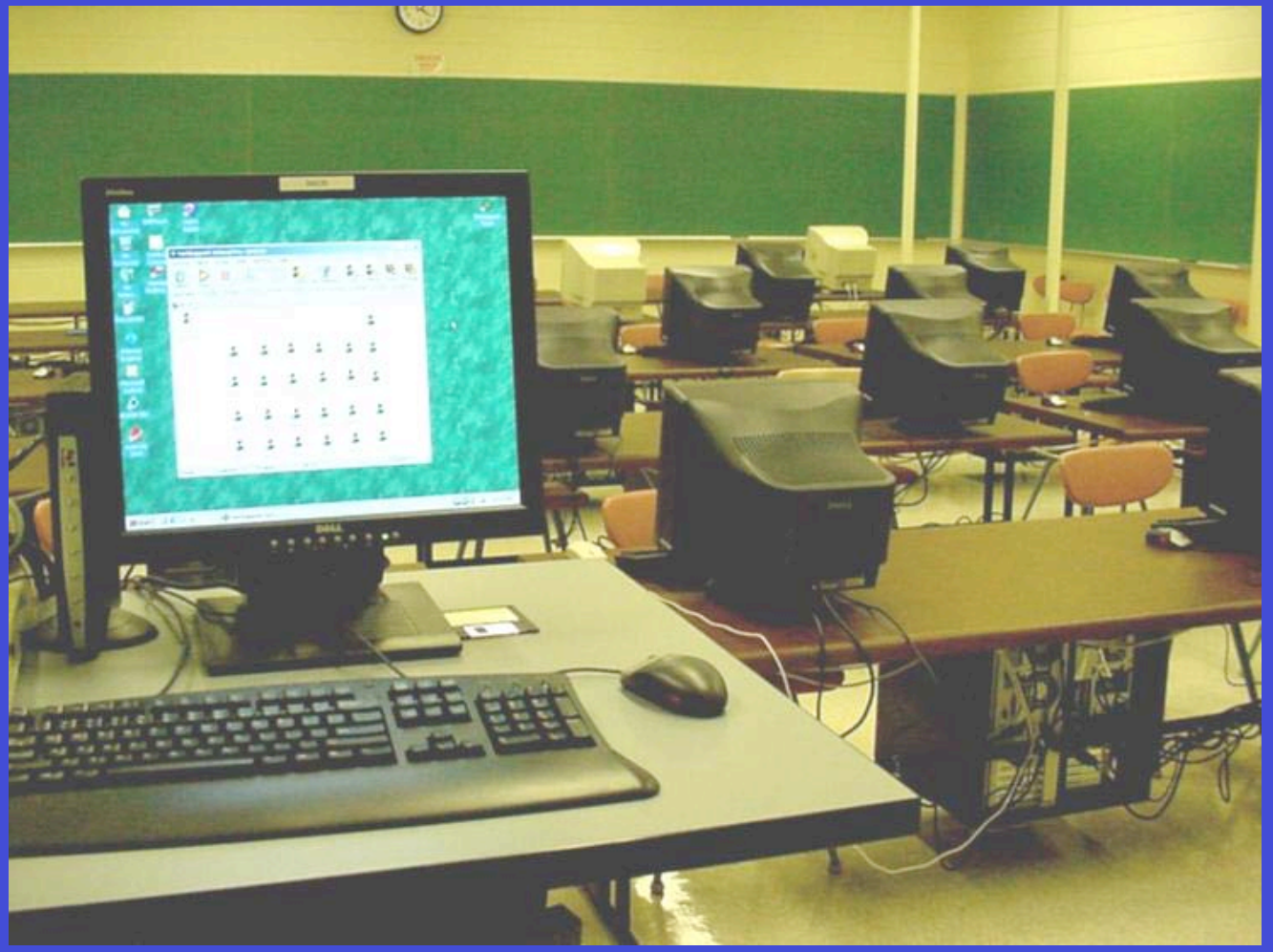
Athens Teacher PC

Student PCs

All PC applications run on Athens Teacher PC

CDE Lab Classroom Design

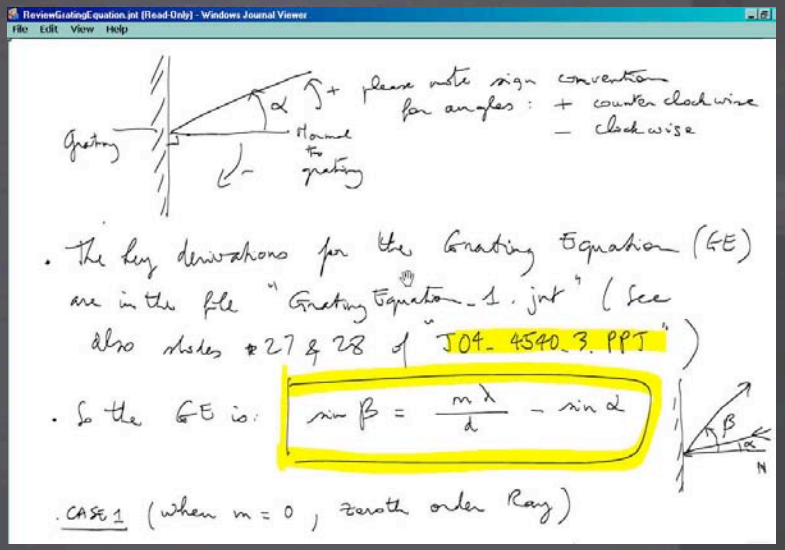
- Standard layout.
- Separate projection screens for data and video conferencing

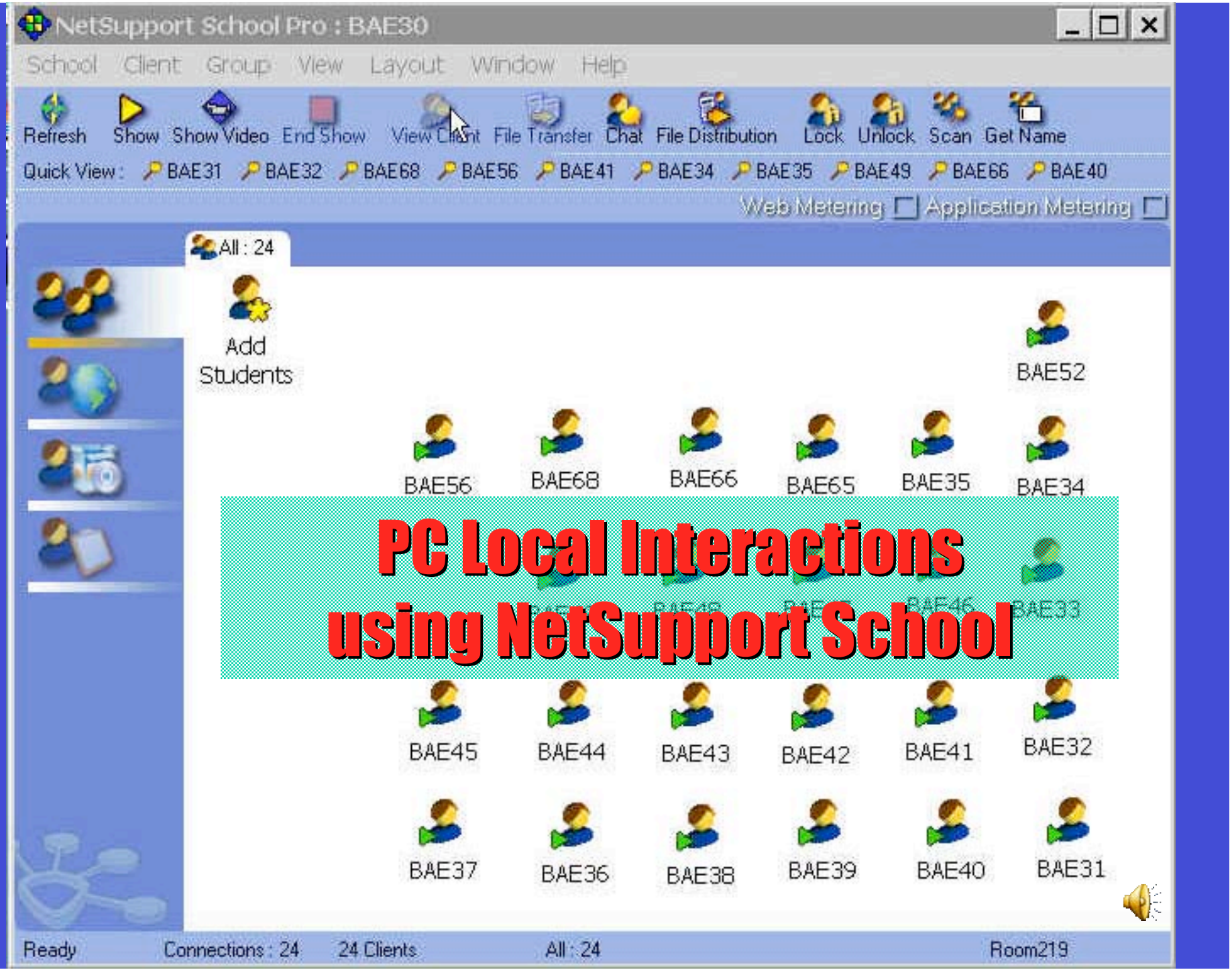


Remote Teacher Presence & Data Screen

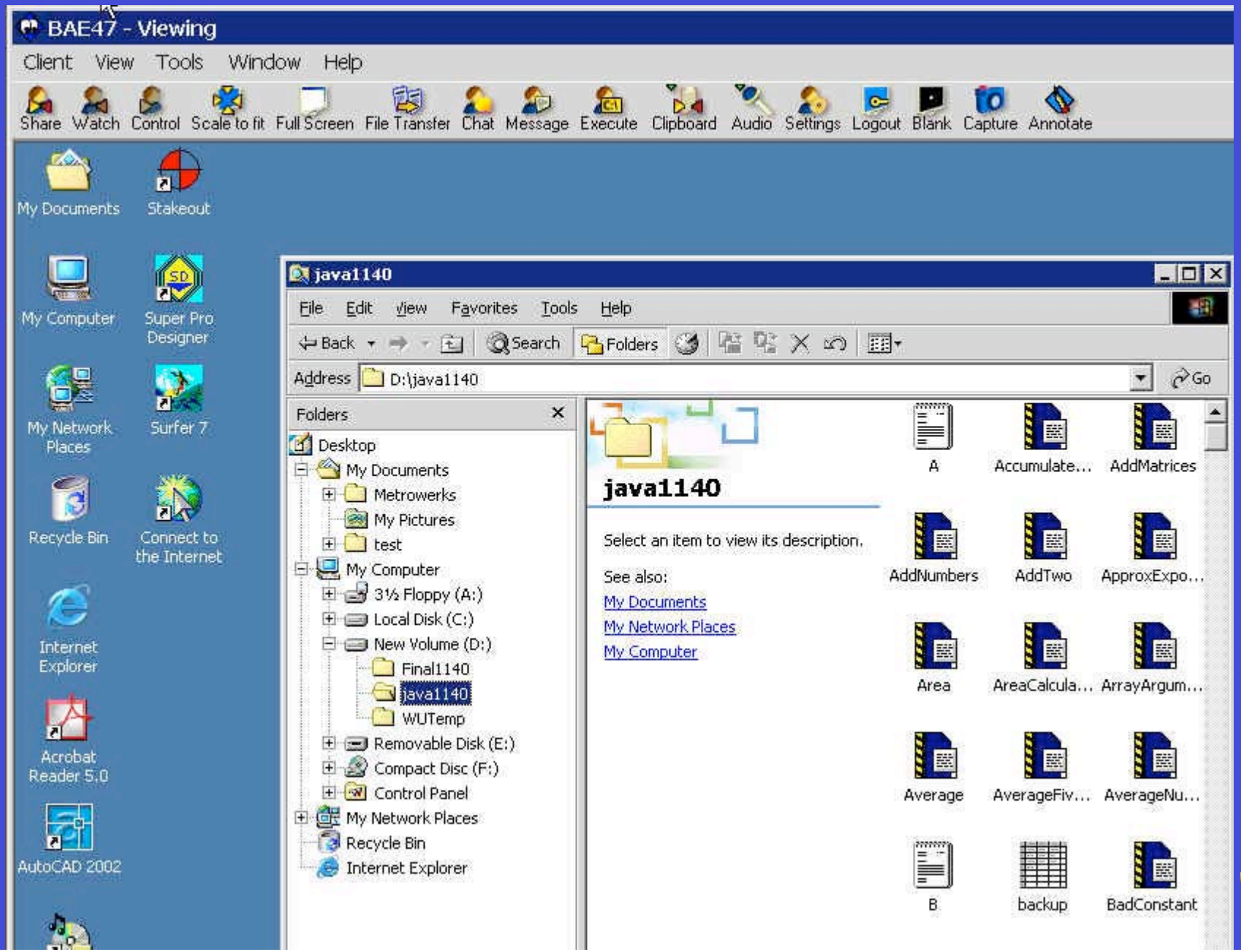
"Talking Head"

Data Screen

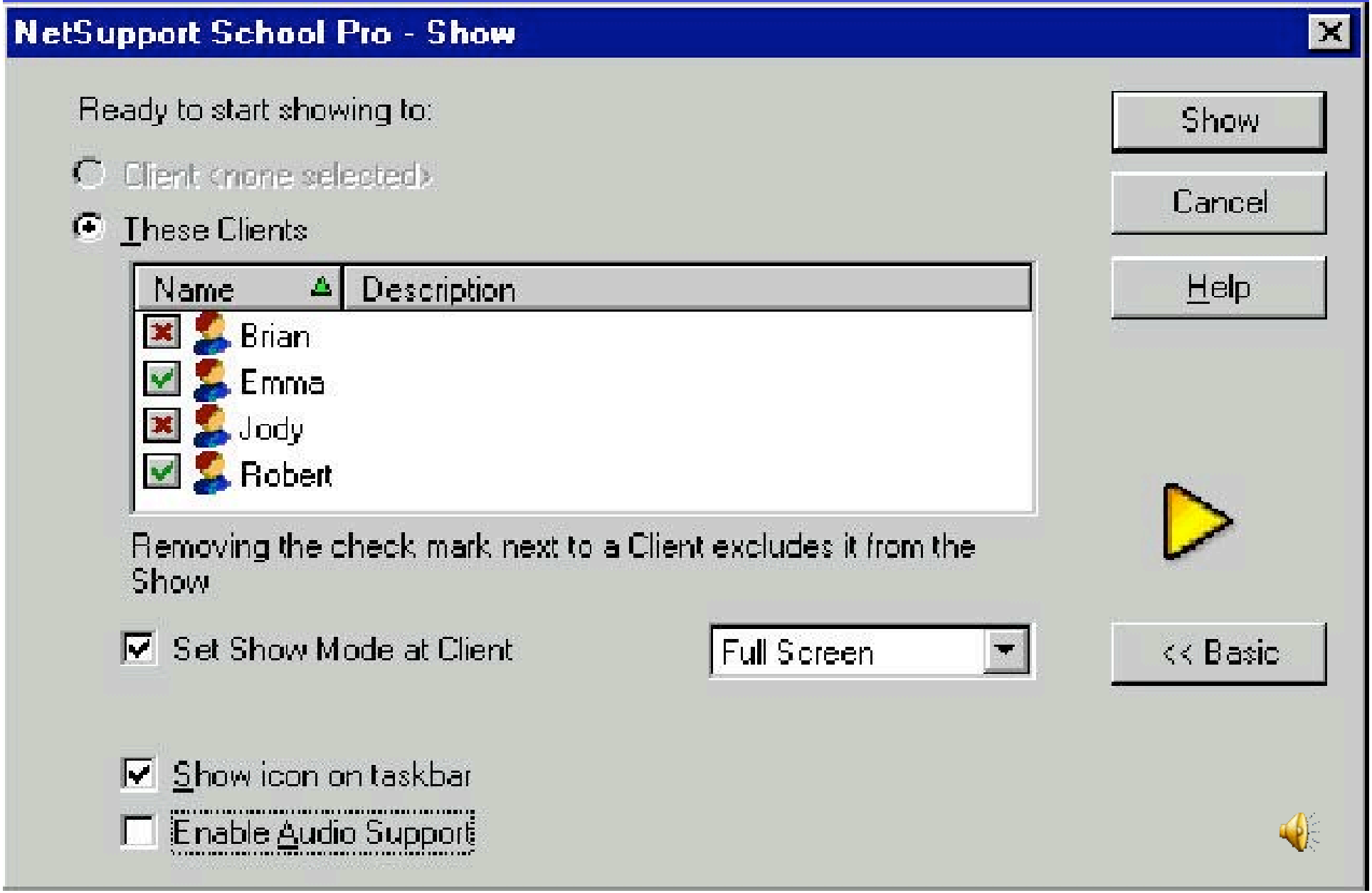



NetSupport School Pro : BAE30
School Client Group View Layout Window Help
Refresh Show Show Video End Show View Client File Transfer Chat File Distribution Lock Unlock Scan Get Name
Quick View : BAE31 BAE32 BAE68 BAE56 BAE41 BAE34 BAE35 BAE49 BAE66 BAE40
Web Metering Application Metering
All : 24
Add Students
BAE52
BAE56 BAE68 BAE66 BAE65 BAE35 BAE34
PC Local Interactions using NetSupport School
BAE45 BAE44 BAE43 BAE42 BAE41 BAE32
BAE37 BAE36 BAE38 BAE39 BAE40 BAE31
Ready Connections : 24 24 Clients All : 24 Room219

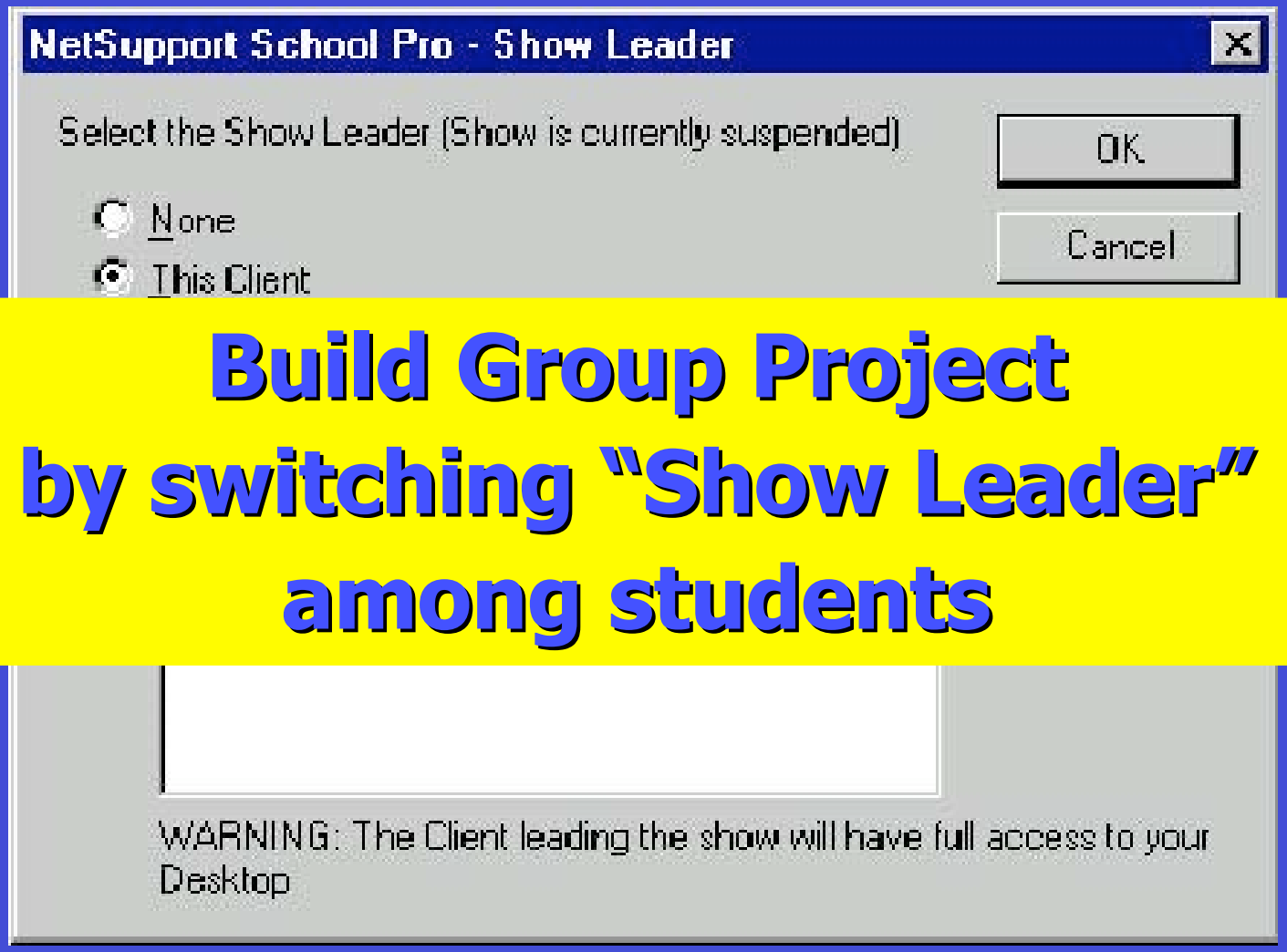
One-on-One: Watch-Share-Control



Show Teacher to Student(s)

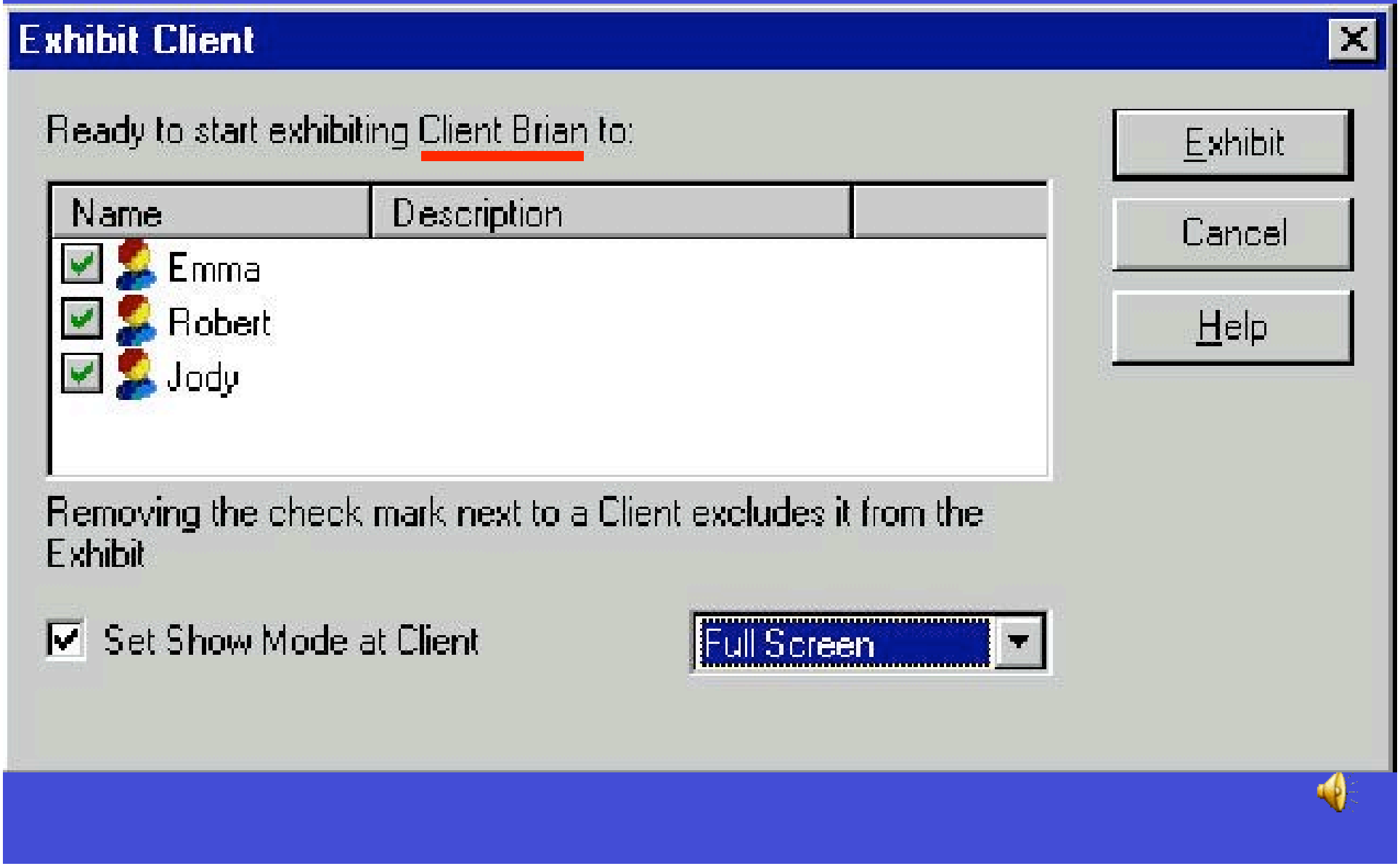


Show Leader



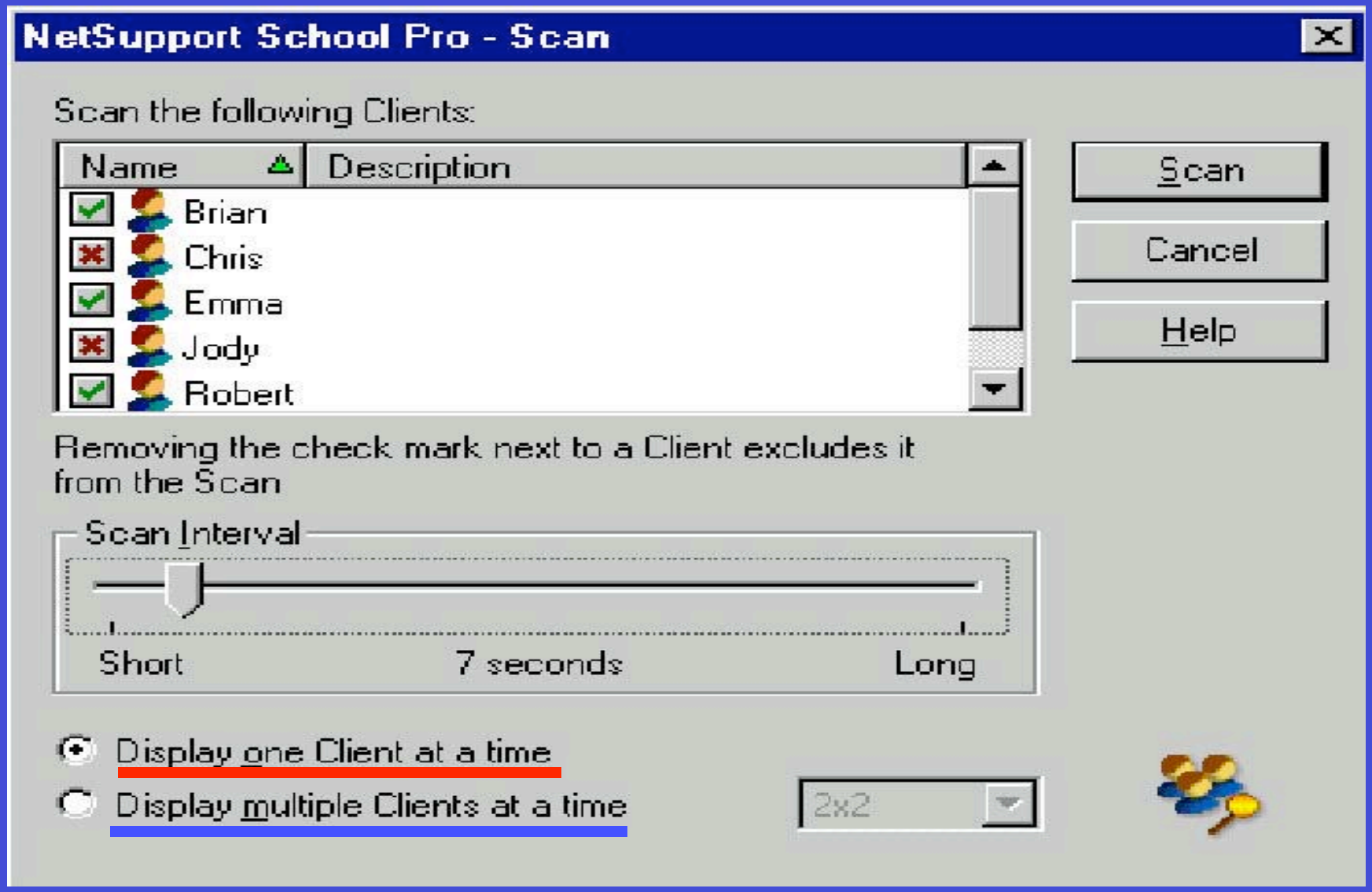
Build Group Project by switching "Show Leader" among students

Exhibit Student Work

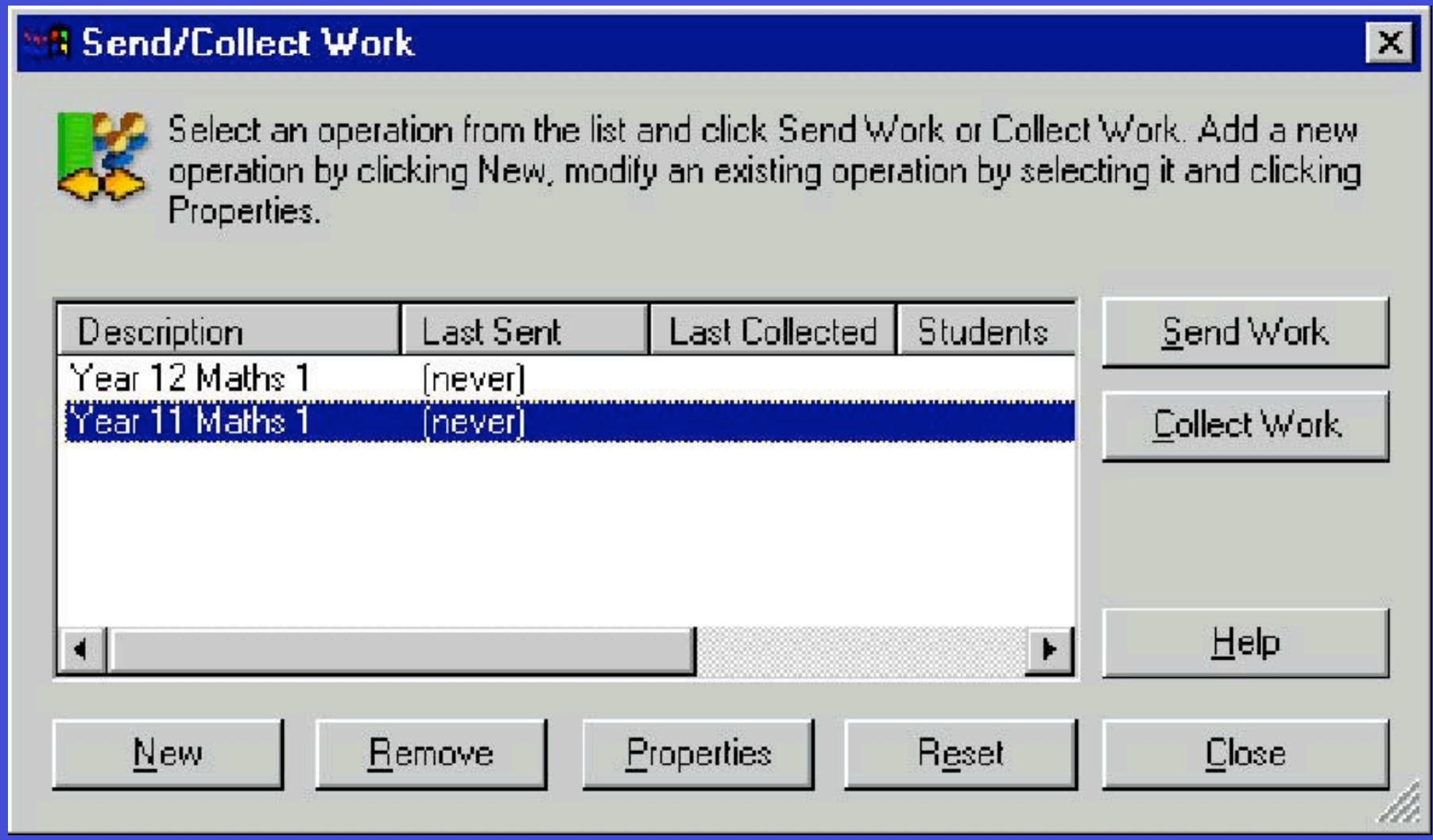


Other Tools

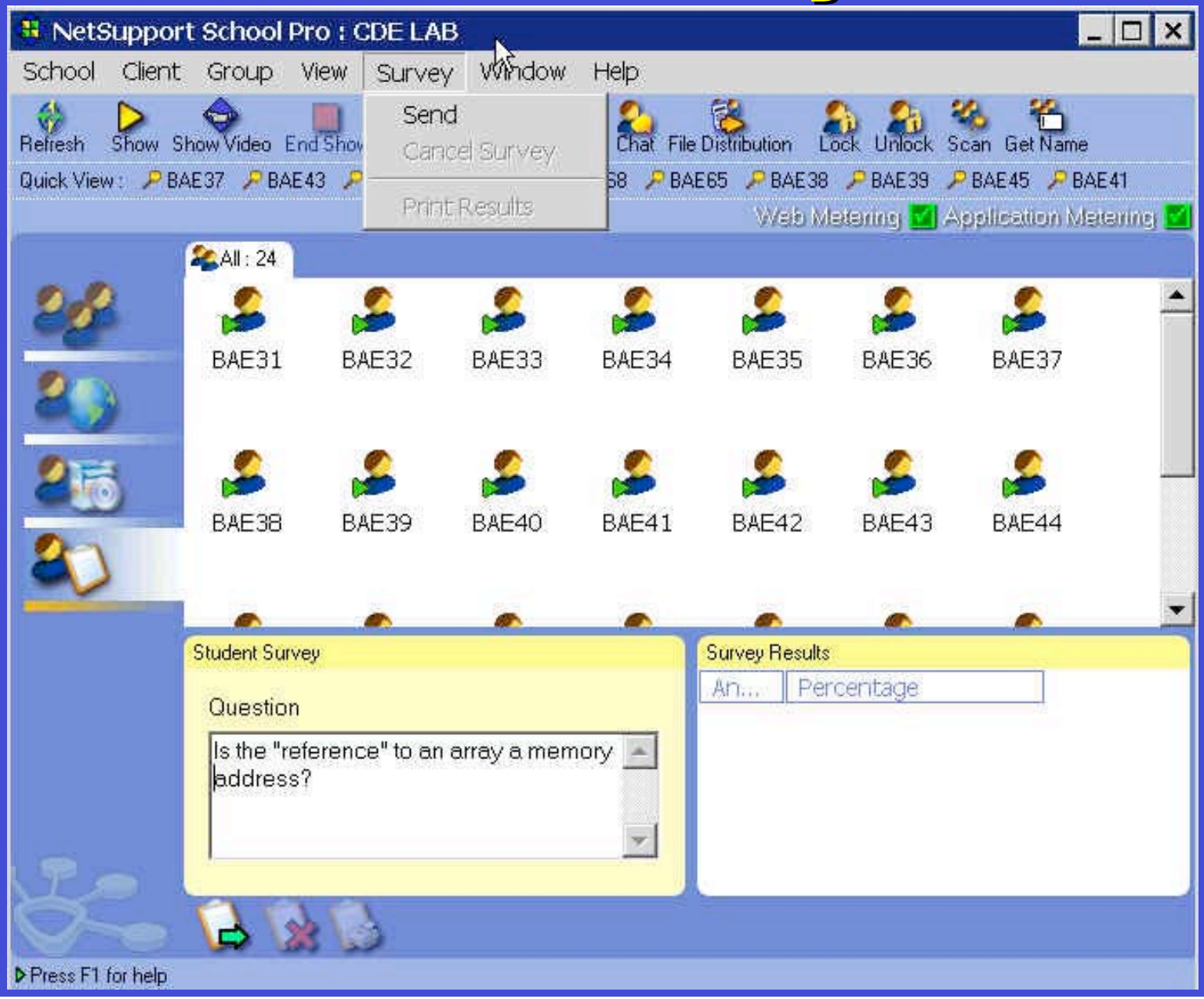
Scanning Student PCs



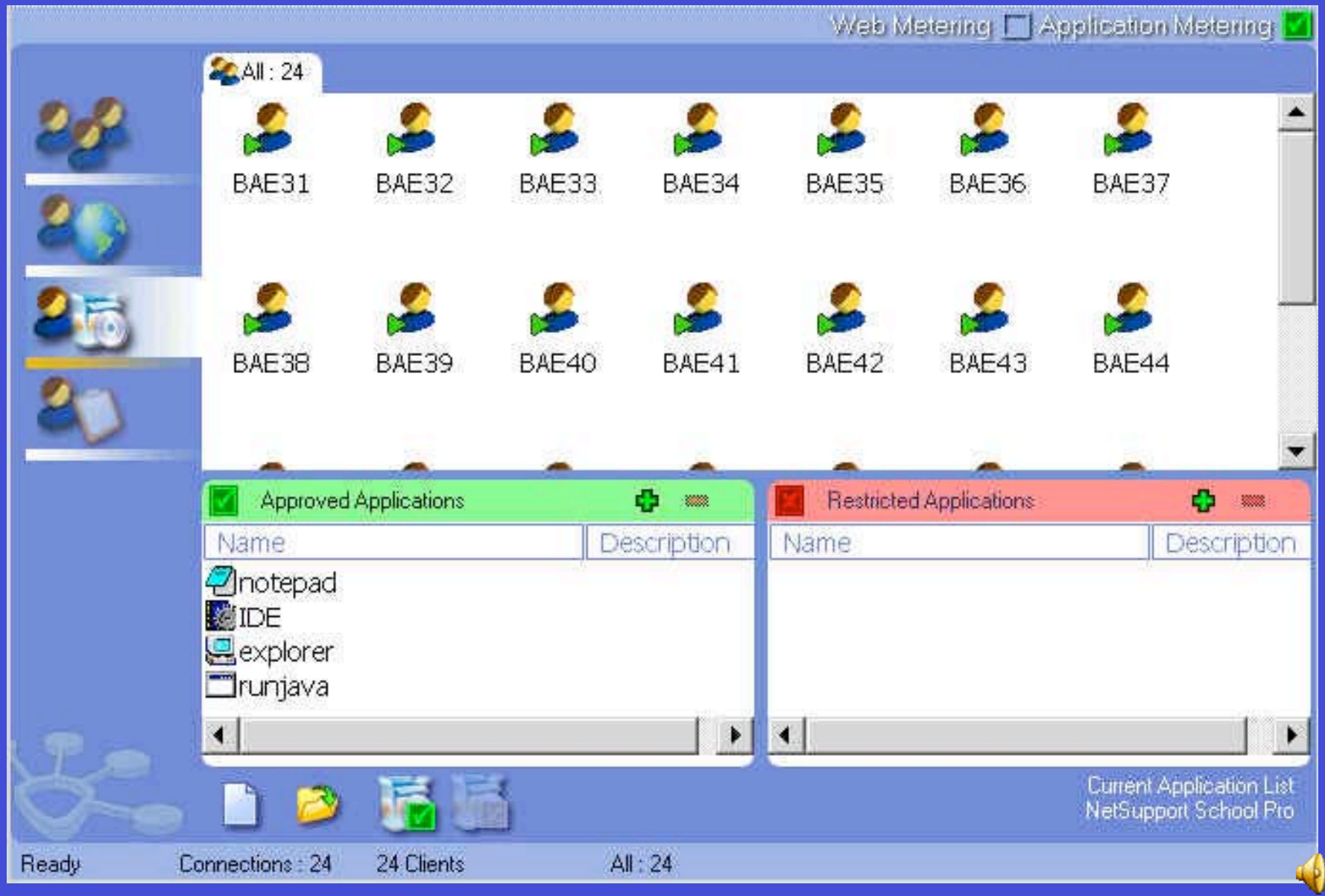
Send / Collect Work Macros



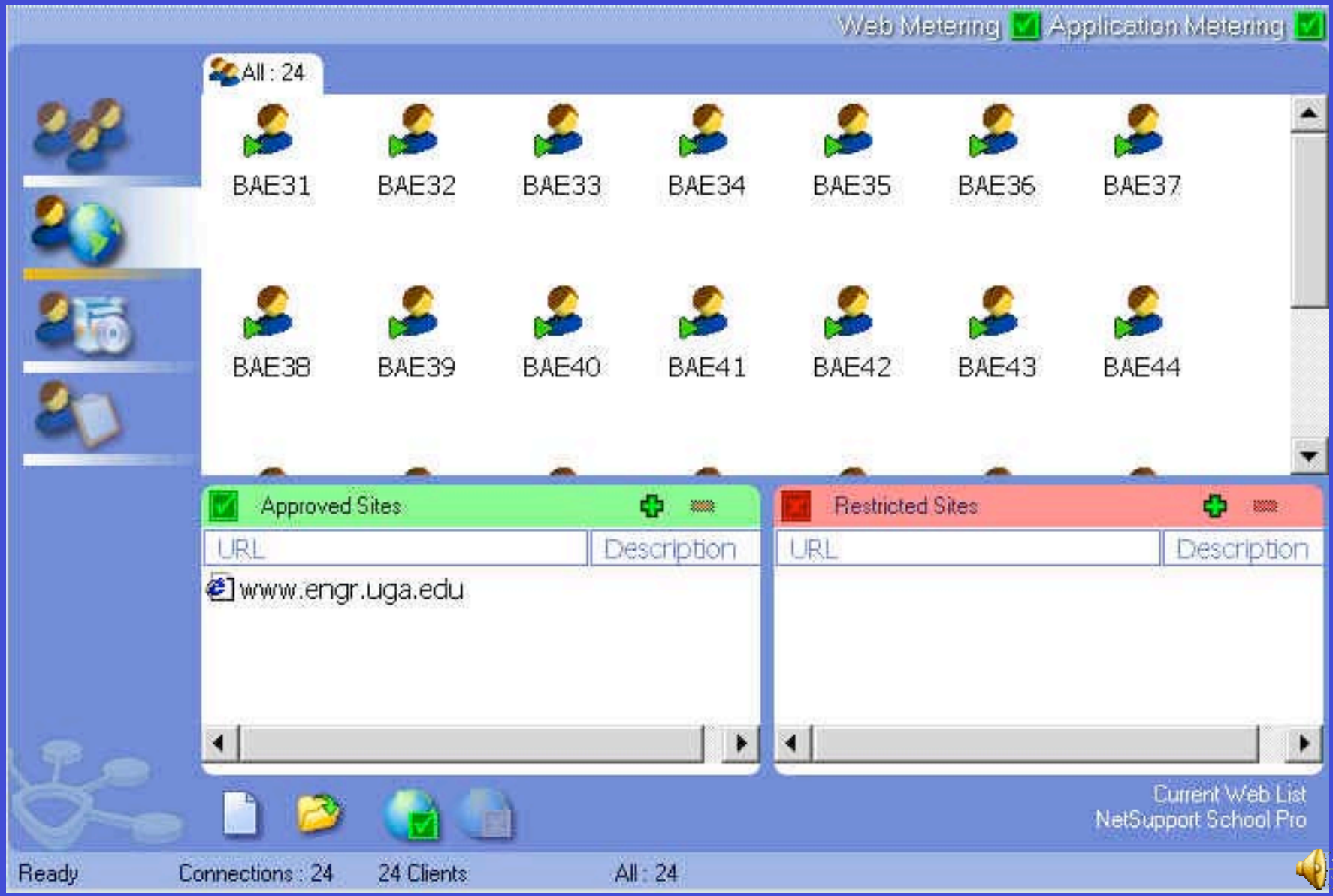
Student Survey



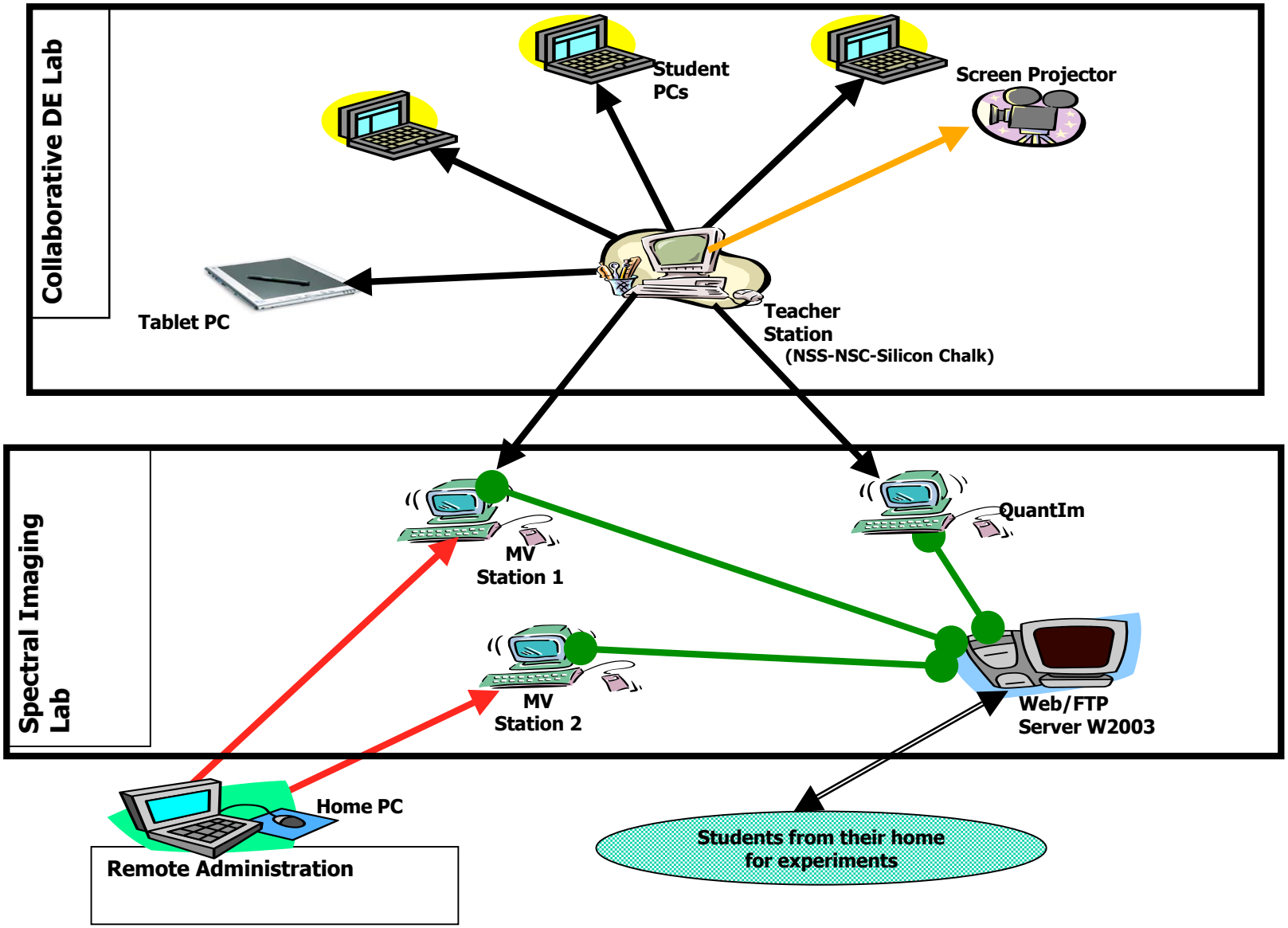
Approved Applications List



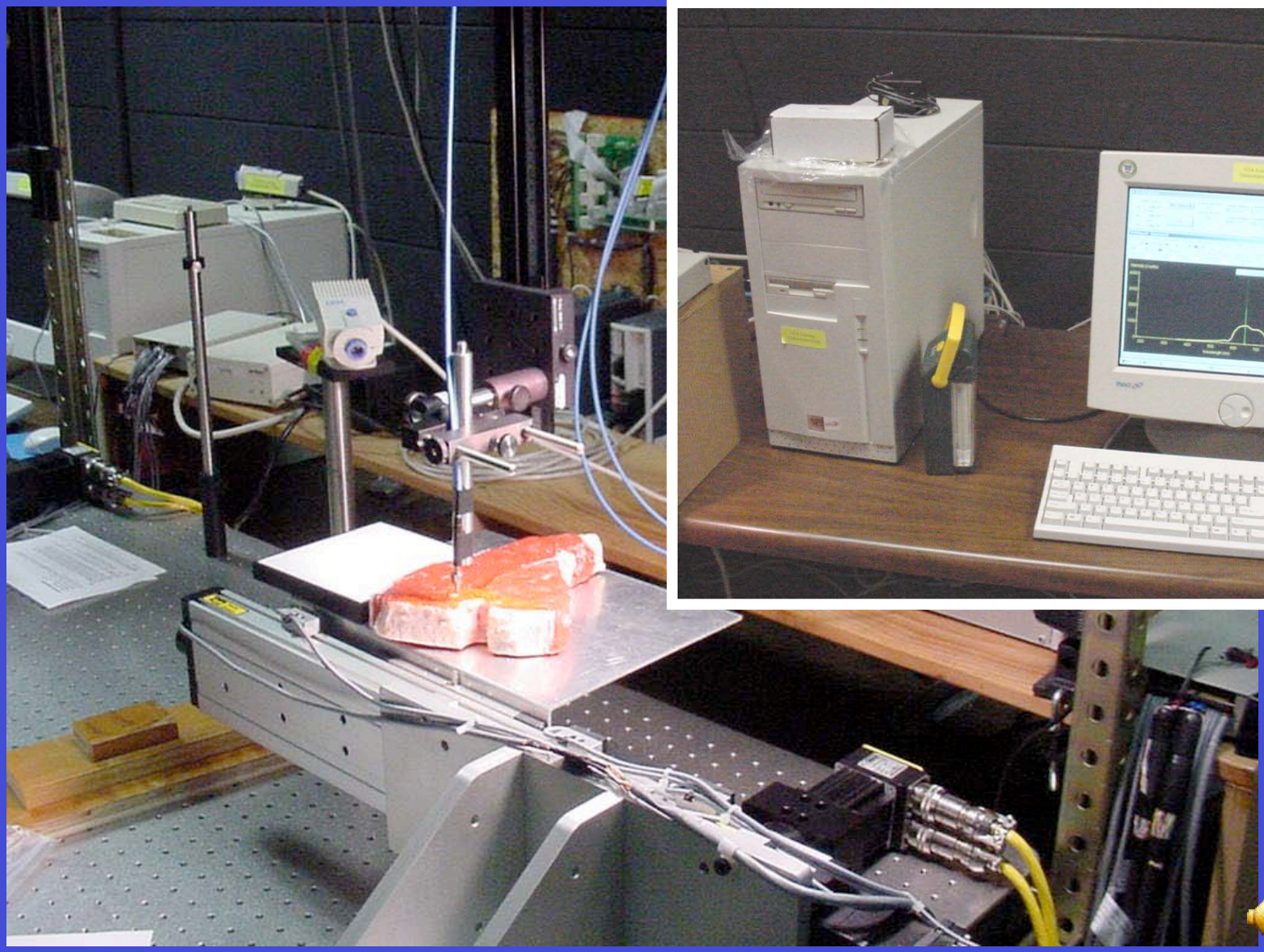
Approved Web Sites List



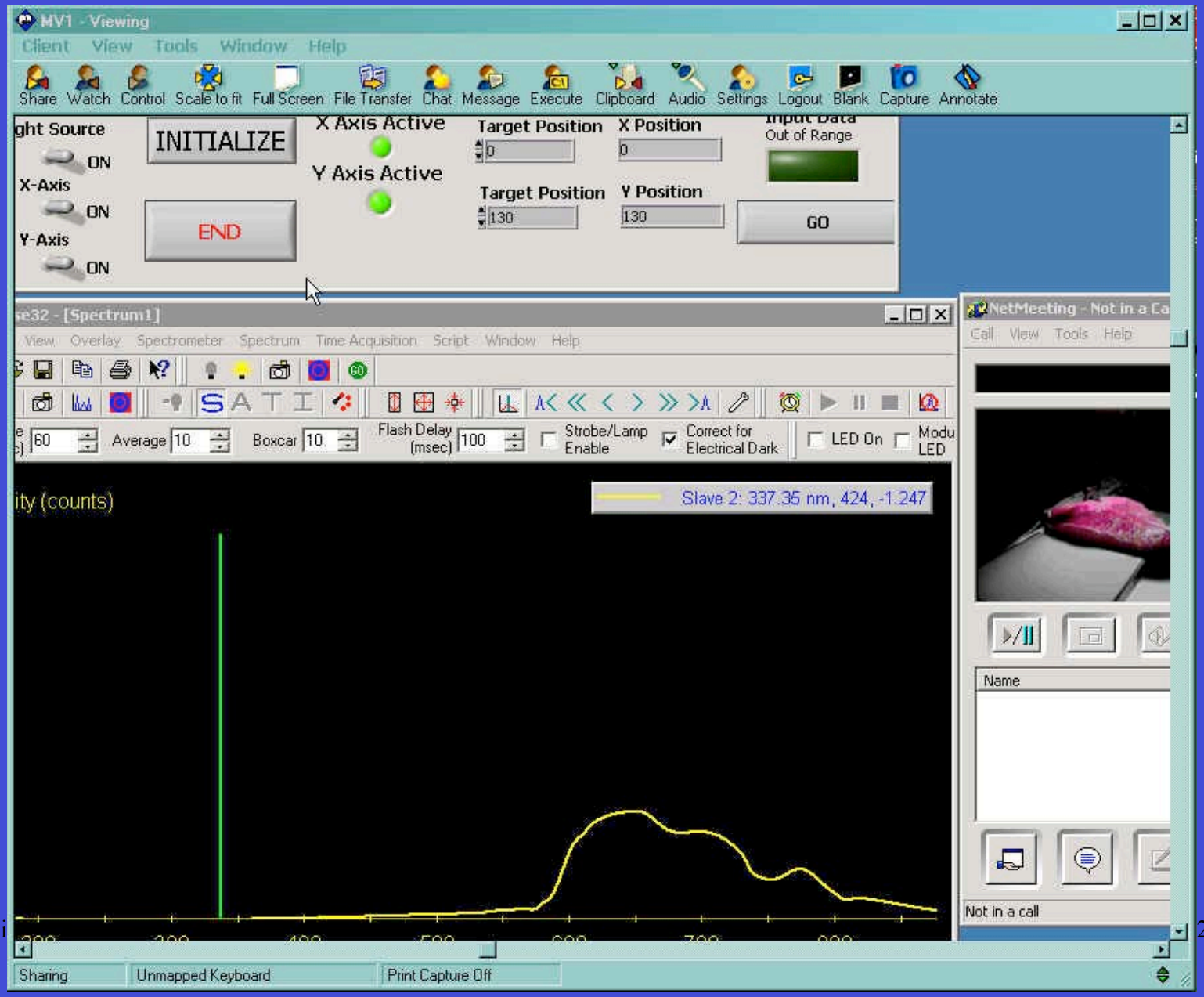
CDE Lab & Applied Machine Vision Course



“Real” Spectral Imaging Lab



Bringing in Live Lab Session to Students



Student Access to Lab (24/7)

Address http://weblabs.engr.uga.edu Go Links

Web Enabled Engineering Laboratories

Multi-Spectral Imaging Laboratory

Fermentation Laboratory

Purpose:

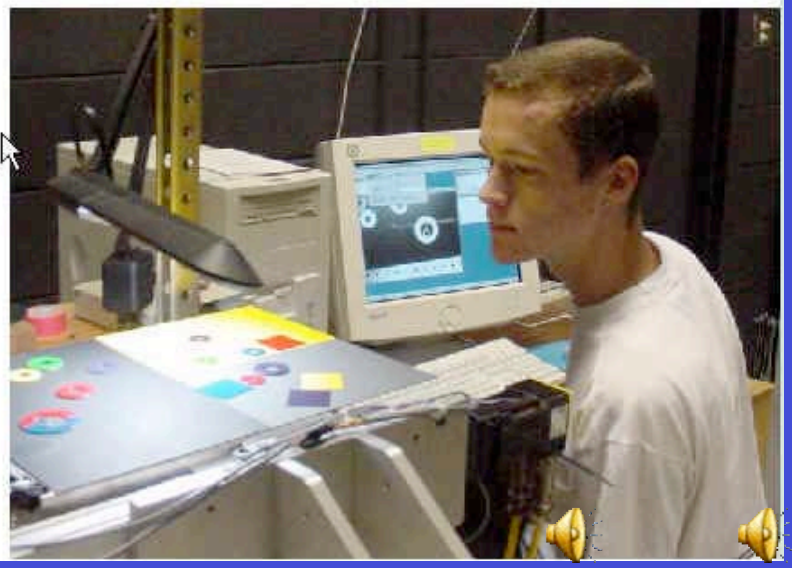
To facilitate student access to state-of-the-art equipment needed for their education.

These laboratories are designed for access by students 24/7 via the web.

The multi-spectral imaging laboratory has been in service since January 2002. Please click on the appropriate link below for a video presentation describing this laboratory (Quicktime version 6 or higher must be installed to view).

Dial Up (56k)

Cable Modem



Spectral Imaging Lab (Web-enabled)

Welcome to BAE Multi-Spectral Imaging Laboratory

Experiment 1
Experiment 2
Experiment 3
Experiment 4
Experiment 5
Experiment 6
Experiment 7

To run this program, you need to install Microsoft NetMeeting3.0 click here to download

Click the following link to connect to the specific vision station

PLEASE REMEMBER TO TURN OFF ALL POWER (i.e. the RELAYS) INSIDE QUANTIM WHEN YOU ARE DONE!

ALSO PLEASE DO NOT CLOSE OUT QUANTIM. THANKS!

Machine Vision 1
Machine Vision 2
Research Station 1
Ocean Optics Spectrometer

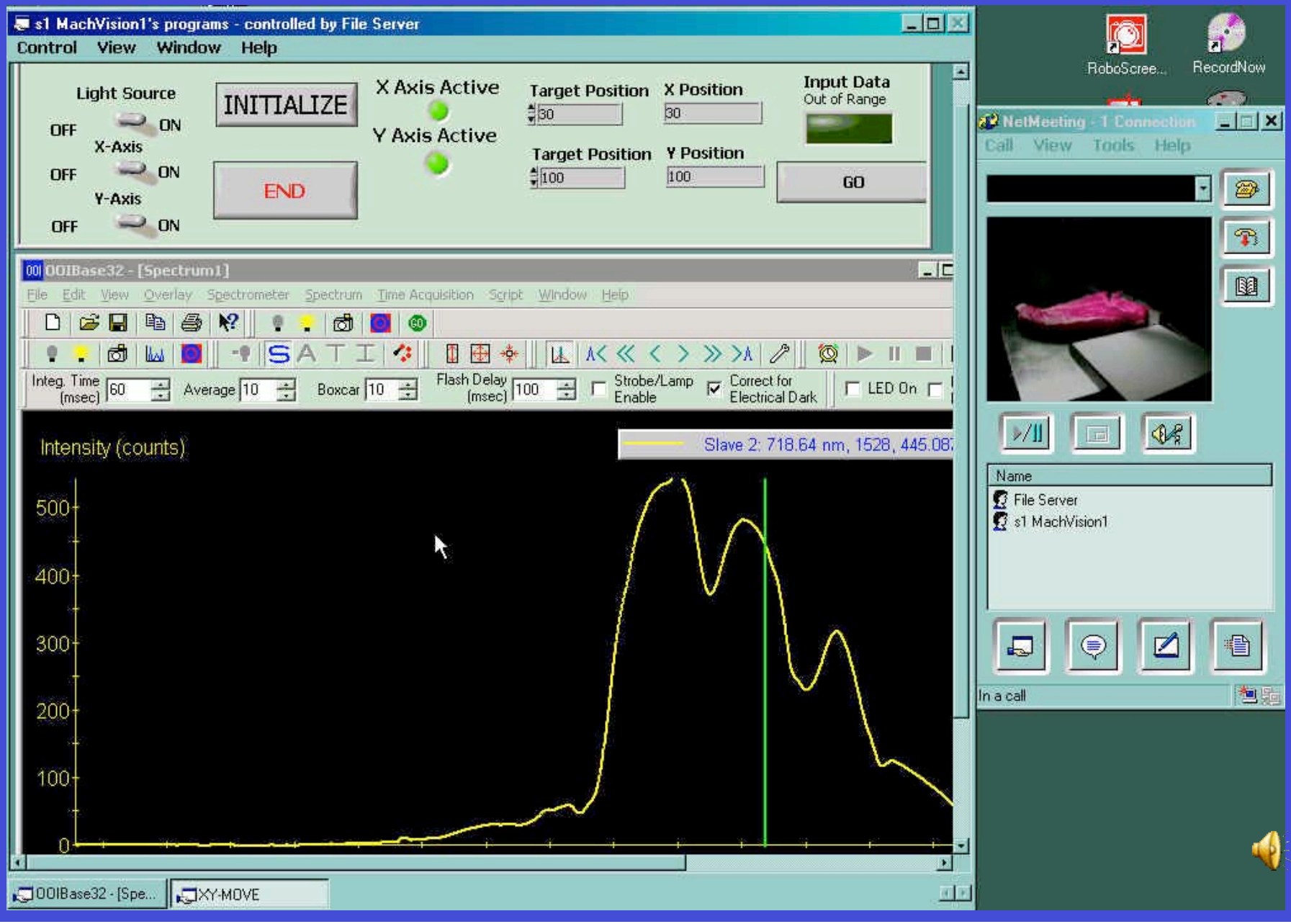
When finish, click this button

Finish

To see the NetMeeting, click the "Undock" button

Undock

Student Access to Lab Equipment



Experimental Instructions (Web page)

Tutorial 1

Tutorial 2

SPECTROMETRY EXPERIMENT No. 1
FOR KAGOSHIMA UNIVERSITY STUDENTS (SPRING 04)

There are 3 parts to this spectrometry experiment:

1. Part A is to show how to set up basic data acquisition parameters (with no light). The goal is to show how system noises.
2. Part B to measure reflectance spectra of the MacBeth color chart under a light source called "Reveal" fro (this is a common household light bulb in the U.S.A.).
3. Part C to measure reflectance spectra of various features of a replica of a T-bone steak, in preparation fo imaging experiments.

In general, as you are remotely controlling equipment located in GA, USA from Kagoshima, Japan, the visual fee initiated by you will be much slower than usual, so be patient while waiting for the actions of your keyboard or m confirmed by changes in the window being displayed back to you.

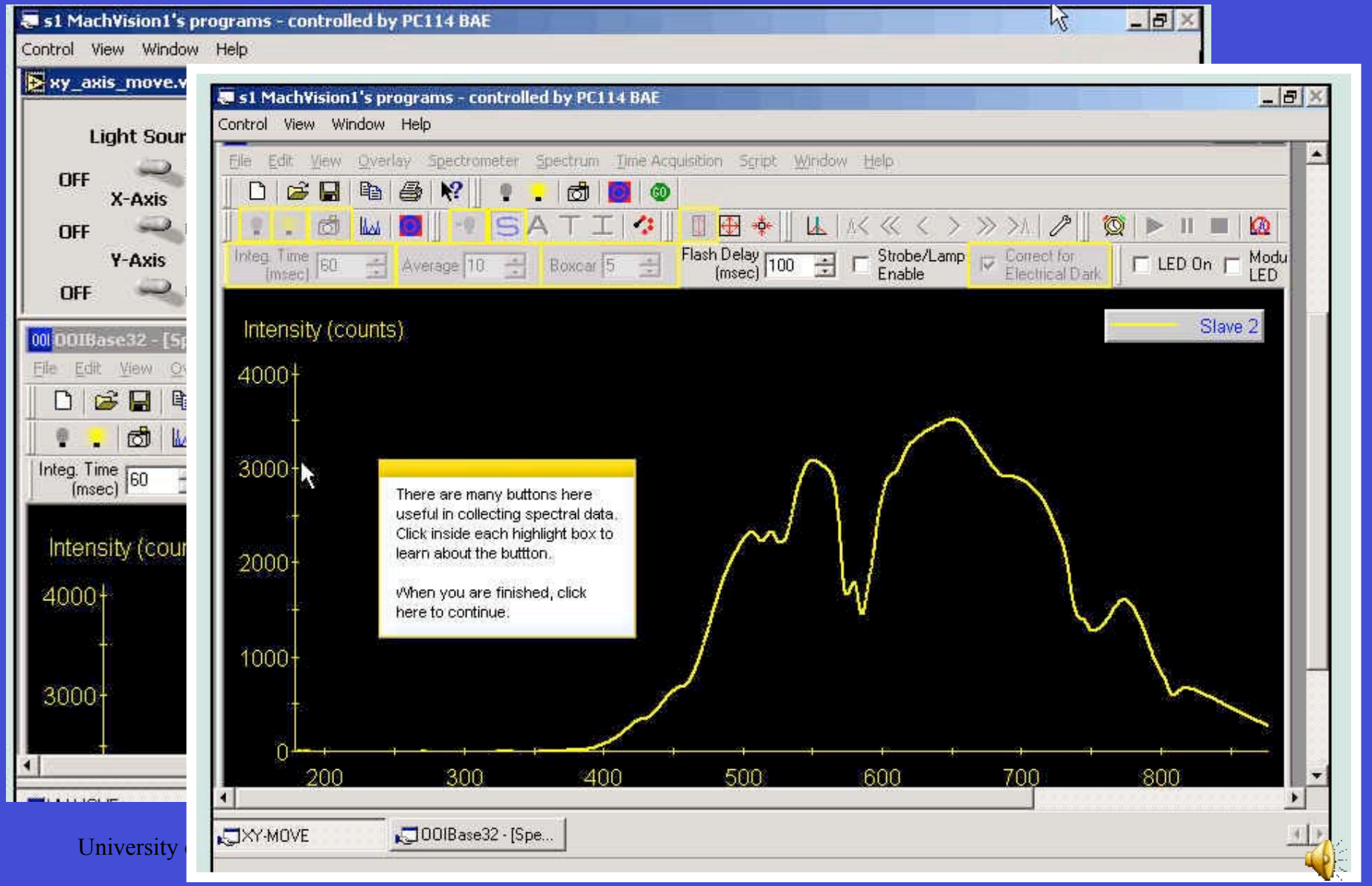
Part A Experimental Procedures

1) Go over the 2 Flash tutorials to learn how to log onto "Weblabs" and for gaining access to the Machine Visio getting familiar with how to use the "X-Y Axis Move" and "OOIBase32" software applications.

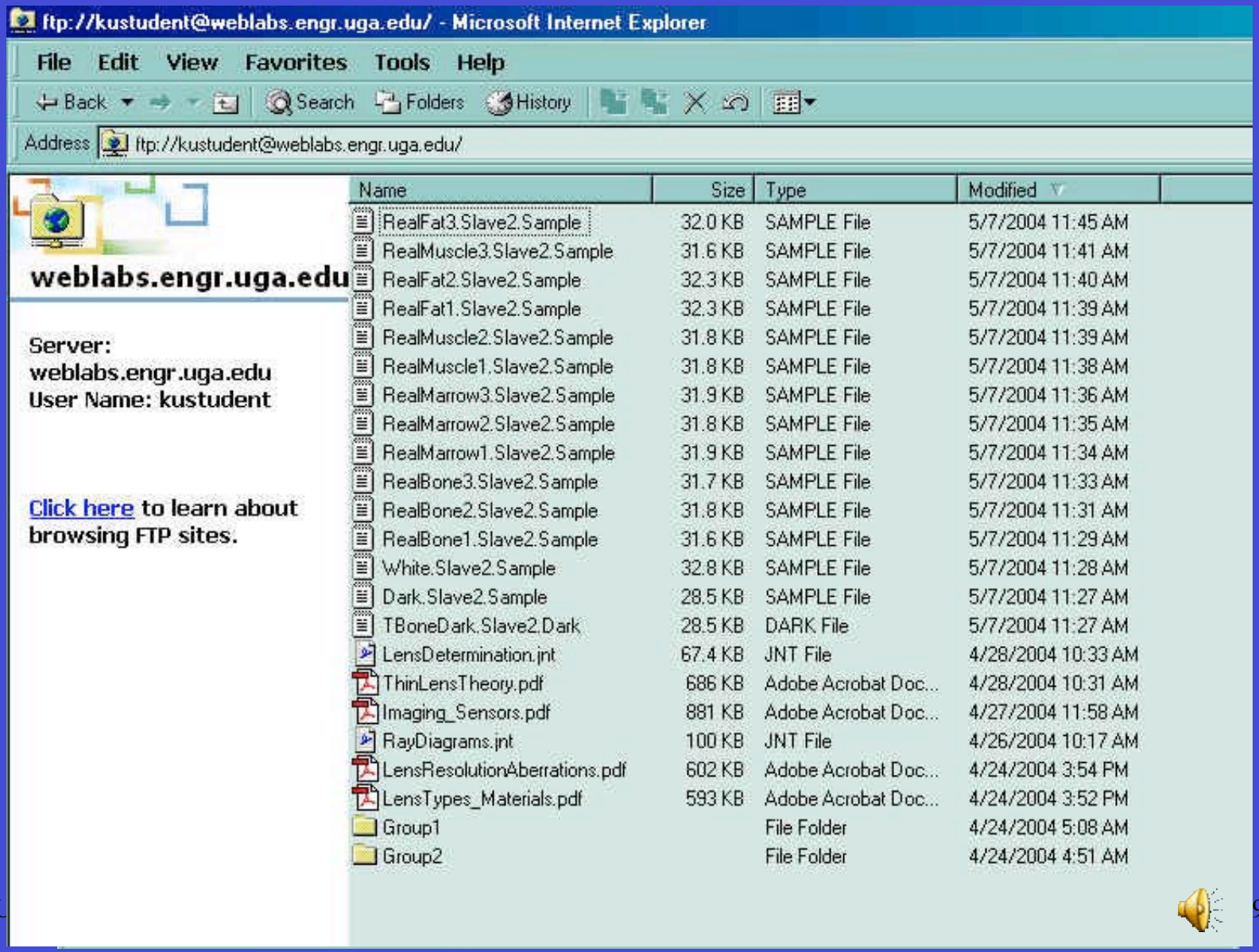
2) Then actually log on to the web site http://weblabs.engr.uga.edu/ in order to gain access to Machine Vision St name "XXXXXXX" and the password "XXXXXXX" that were given to you by the instructor.

3) Click with the mouse on the title bar of the "xy_axis_move.vi" window, and when it turns blue, you are now in this software application (the mouse cursor changes from an arrow to a hand icon). Make sure that the toggle sw source is turned OFF. The "X-Y Axis Move" window should look like Figure 1.

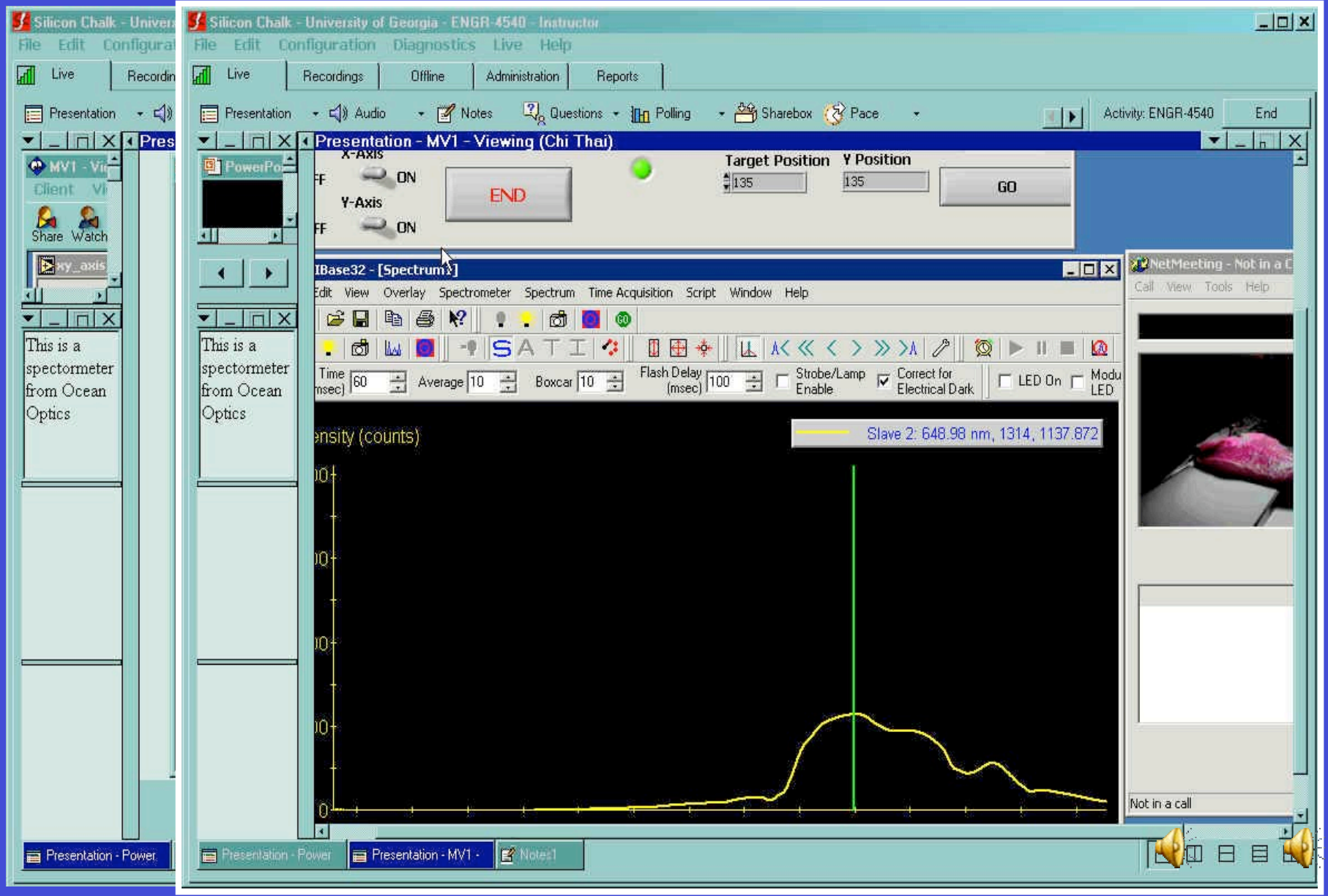
Narrated "How to" Tutorial



Student Data Collection & Download



Live Lecture Recording with Silicon Chalk



Conclusions

- We can integrate several hardware and software components together to obtain an instruction engineering system that students can use during class as well as after class.
- With increased and easier access to instructional materials, ones can then hope and perhaps expect that students will learn better.