

**University of California Larry L. Sautter Award Submission
for Innovation in Information Technology**

UC Riverside Statistics/C&C

eClassroom

Project Team Members

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Project Abstract

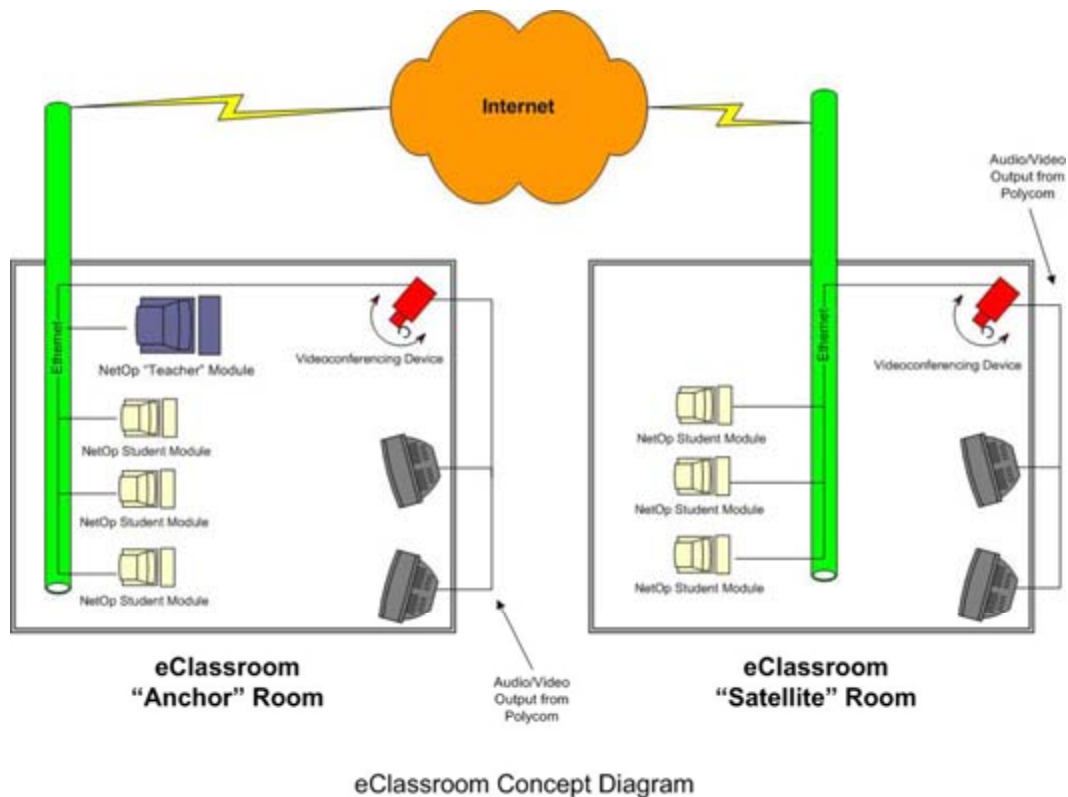
To efficiently meet the challenge of increasing enrollment, the eClassroom was developed to provide an interactive, participative learning environment for classes utilizing computer-aided instruction, especially undergraduate Statistics. Via videoconferencing equipment and IP-based computer lab management software, the eClassroom incorporates two multimedia labs into a single virtual classroom. While every university thrives on improved enrollment, every university faces the physical limitations of space – the eClassroom scales in proportion to demand, accommodating larger class sizes by simply linking additional rooms via UC Riverside's high-speed network.

Project Description

The eClassroom is a result of an innovative collaboration between the College of Natural and Agricultural Sciences, the Department of Statistics, and Computing and Communications. When the main Statistics lab (12 workstations) could no longer accommodate sufficient class sizes, Dr. Keh-Shin Lii (the Statistics Department chairman) and Chuck Rowley (Associate Vice Chancellor, Computing and Communications) developed the eClassroom concept to allow for more students to participate per lab session.

The goals were to:

- Create an electronic classroom large enough to make a meaningful reduction in the number of undergraduate statistics sections.
- Utilize technology to allow faculty to control and manage each student's work from a central location, especially given the increase in class size.
- Allow faculty to highlight work from a particular student or group of students for the entire class.
- Allow faculty to introduce multimedia material (from a VCR, laptop, document camera, etc.) to offer students a richer classroom experience.
- Create an infrastructure that would allow growth; specifically, to utilize classroom technology that would allow classrooms to be linked across campus via UC Riverside's high speed network.



Technology

The eClassroom project utilizes Instructional Technology to:

- deliver academic material simultaneously to networked stations in different physical locations
- improve administration processes by relieving the "existing space vs. expanding enrollment" issue
- allow the instructor/student ratio to grow *while*
- increasing the instructor's ability to provide an individualized, personal learning experience for each student.

Specifically, the eClassroom is two multimedia labs interactively connected with Polycom videoconferencing equipment, NetOp School classroom control software, and a Windows NT server addressing 42 Pentium-class personal computers. By using industry-standard products, UC Riverside has guaranteed the longest possible product longevity and the highest level of supportability in terms of repair and functional assistance.

H.323 Polycom videoconferencing equipment facilitates the student-instructor interaction between the two rooms. Importantly, H.323 allows the videoconferencing to operate in a two-way fashion – coupled with ceiling-mounted microphones and the ability to pan and zoom, a truly interactive setting is established. The main room displays its video feed with a ceiling-mounted LCD projector and 60” screen while the extension room employs two 32” television monitors.

NetOp School, a high-performance remote control software package, provides an instructor with mechanisms with which to demonstrate various software functionality to students in both rooms and methods for allowing small workgroups to collaborate on group projects. With unfettered Internet access on all 42 workstations, there is the potential for students to "wander off" while ignoring their instructor. NetOp School has provided contingencies for such instances with the "Mosaic View" (snapshots of all connected computers on the instructor's desktop) and the "Attention Button" (locks any or all of the connected computers).

From their workstation, instructors can also:

- display the content of any particular computer screen on any or all of the student computers and simultaneously use NetOp's "Marker Mode" to highlight relevant screen content.
- distribute or collect documents to/from students simultaneously.
- create "breakout sessions", selecting one student as "group leader".

Students can request instructor help by clicking an icon in their desktop's system tray and in response, an instructor can opt for a real-time text chat or, if necessary, assume control of the student's machine.

Support for the computer system is provided by high performance drive imaging technology – Ghost by Symantec allows administrators to restore or deploy a Windows operating system image onto each of the workstations in mere minutes. Technicians can also remotely clone any workstation, deploy specific changes such as registry or desktop settings, or configure critical data such as TCP/IP settings and machine, workgroup, or domain names – all from a central console.

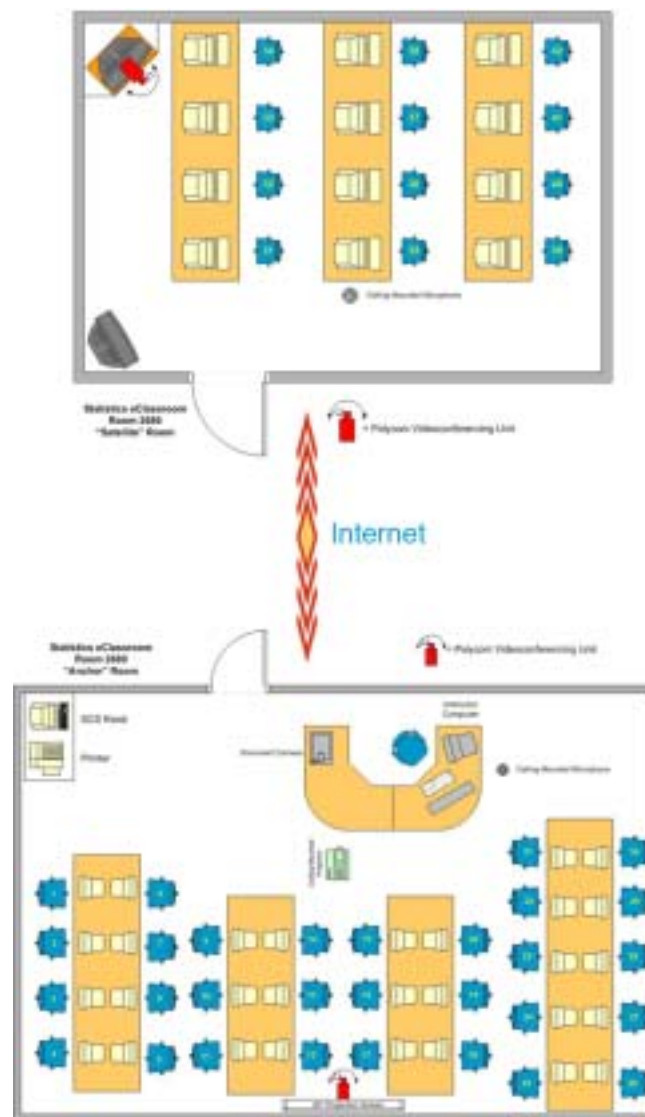
The eClassroom concept and design are:

- portable to any campus requiring tools with which to meet the challenge of expanding enrollment
- scalable to an almost infinite level due to its use of Internet Protocol

- readily implemented with industry-standard technology (affording the highest level of product longevity and supportability)
- assessable by directly defeating demands for new construction and class displacement
- inherently collaborative, fostering student-faculty engagement and collaboration between different departments and disciplines.

Graphical Overview

Below is a graphic representation of Statistics Labs 2686 and 2680.



Relevant URLs:

[eClassroom @ UCR](http://cnc.ucr.edu/eclassroom) <http://cnc.ucr.edu/eclassroom>

[Polycom](http://www.polycom.com/home/) <http://www.polycom.com/home/>

[NetOp School](http://crossteccorp.com/netopschool/) <http://crossteccorp.com/netopschool/>

[Ghost by Symantec](http://enterprisesecurity.symantec.com/products/products.cfm?ProductID=3)

<http://enterprisesecurity.symantec.com/products/products.cfm?ProductID=3>

Customer Satisfaction Data

UC Riverside's eClassroom came on-line in the Fall 2000 academic quarter and has been used successfully by a number of faculty teaching various courses in Statistics. Dr. Linda Penas, a UCR lecturer and instructor currently using the facility, had this to say about eClassroom's multimedia teaching experience: "The impact of this facility on teaching capabilities and student learning has been enormous. Multicasting of digital content has enabled our instructors to enhance visual communications with students. Using this facility has enabled us to provide detailed individualized attention in a large classroom setting. The interactive capabilities have transformed even shy students, who tend to "hide" in the classroom, into active participants. In this day and age of computer and video games, it is sometimes difficult to generate student enthusiasm and maintain their concentration. This facility, often described by students as "really cool", has provided an environment that has invigorated interest and piqued curiosity among students."

In the future, off-site connections will be facilitated through a dedicated server, which will allow for monumental changes in the actual method of attendance. I.e., from her office or home, an instructor may hold a lab session in which her students are logging on from locations most convenient for *them* - a dorm room, a library, a commons, the cafeteria or campus greens. Videoconferencing technology will stream live through the internet, facilitating both archival and review processes.

As technology advances, the eClassroom concept will evolve, creating whole new experiences in the student-instructor dynamic. As Dr. Penas says: "We're on the ground level – the eClassroom has more capabilities than we can possibly think of yet."