University of California
Application for 2005 Larry L. Sautter Award
for Innovation in Information Technology

University of California, Riverside
Smart Classrooms

Project Team Members
Computing and Communications - Multimedia
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Summary

UCR Computing & Communications (C&C) was challenged with designing a service model that provided a higher level of technology support in the classroom, with existing support staff, while meeting the new needs of faculty. Those needs included technology ease of use, immediate helpdesk support and additional network services in classrooms. Our solution was an IP-based multimedia controller that is in-house programmable, scalable and robust. In addition, classroom network and phone communication services were expanded. This package was deployed in all General Assignment classrooms throughout UCR in the summer of 2004.

Highlights

- “Just in Time” faculty support
- Multimedia support increased dramatically through the use of technology
- Revolutionary support has yielded unparalleled faculty satisfaction

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Fall 2004 Classroom Technology Survey Results
Did the available technology (projector, sound system, document camera, etc.) in the classroom meet your pedagogical needs?

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>% of Total</th>
<th>Professor</th>
<th>Assoc. Professor</th>
<th>Asst. Professor</th>
<th>Lecturer</th>
<th>Grad Student</th>
<th>No Role Specified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completely</td>
<td>99</td>
<td>66%</td>
<td>20</td>
<td>6</td>
<td>19</td>
<td>16</td>
<td>38</td>
<td>2</td>
</tr>
<tr>
<td>Mostly</td>
<td>48</td>
<td>32%</td>
<td>12</td>
<td>4</td>
<td>8</td>
<td>11</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>Partially</td>
<td>2</td>
<td>1%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at All</td>
<td>0</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Totals</td>
<td>149</td>
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<td>32</td>
<td>10</td>
<td>27</td>
<td>27</td>
<td>52</td>
<td>1</td>
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</tbody>
</table>

98.7% of respondents answered either Completely or Mostly
Project Description

In 1999 C&C began a 4 year project to upgrade classroom technology in all general assignment classrooms. Classroom technology now includes an LCD Projector, DVD Player and VHS Player with some PCs and digital document cameras. Faculty found it difficult and inefficient to figure out how each of the classroom technologies operated while fiddling with the various remote controls. Going from room to room resulted in confusion as technology instructions and classroom setups varied. This resulted in a loss of valuable class time and no assistance readily available.

Over the summer of 2004, C&C upgraded the classroom multimedia with IP based “single point of control” systems. These systems control the projector and video players in addition to switching inputs and adjusting the audio in the classrooms. We selected the Extron System 5 IPs because they are robust, user programmable and can be supported over the network. Standardizing this panel in all classrooms allowed faculty to control the multimedia from a single interface and move from room to room without having the challenge of learning a new panel. Projectors and various media players can easily be changed, but the user interface will remain consistent, making it easy for faculty to control the ever expanding technology without having to learn new settings or new buttons.
Leveraging Technical Staff

These Extron systems provide immediate reports over the web. Technologists can now monitor projector lamp hours, system status and projector security. Helpdesk support can be provided from anywhere and at anytime. These networked systems have already prevented three sure thefts. If a projector is disconnected from the system, these units send an email alert that forwards to staff cellphones. Since the installation of these systems in September, multimedia staff have called UCPD on three occasions and requested officers visit classrooms. UCPD officers have found the projection units in all three occasions tampered with, but not taken.

The buttons on these panels are programmable and configurable. We programmed one button to be a HELP alert and configured it to turn red when depressed. This lets the user know that a HELP signal has been sent. This signal comes in the form of a coded text message which is forwarded directly into staff cellphones. This message includes the room number and phone extension number for that classroom. It allows staff to easily identify the room and call the faculty member experiencing difficulty from anywhere and at anytime.

These alerts are also received in a dedicated desktop computer with audio. As the alerts come in, staff immediately will call the classroom and try to walk the faculty through the problem.

Multimedia staff cellphone with a help alert.
These systems are also web servers that provide reports and a webpage that acts as a remote interface to control the technology. Technical staff have the ability to turn on projectors remotely, control the various players and adjust the audio. This has proven useful when providing phone support by helping faculty select the proper settings. If the staff is not able to resolve the issue over the phone, the staff member will immediately dispatch a classroom technologist to provide assistance in the classroom.

![System 5 IP Default Web Page]

Standard classroom System 5-IP webpage
Global Viewer is the web-based software that comes bundled with the System 5-IPs. This software allows technical staff to cluster rooms into groups and view classroom projector status and lamp hours. An alert was programmed that emails support staff when a lamp is reaching its life expectancy. As lamp hours draw near their useful life we schedule a time to replace them. This minimizes the monitored chances of projector “down time” during instruction. This has reduced the frequency of classroom visits by technicians.

<table>
<thead>
<tr>
<th>Unit Name</th>
<th>IP Address</th>
<th>Projector Status</th>
<th>Power Status</th>
<th>Lamp Hours</th>
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<tbody>
<tr>
<td>SPR-2335-SY53</td>
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<tr>
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</table>

Global Viewer monitoring UCR Sproul Hall classrooms
The technology installed in lecture halls include PC computers and digital document cameras. Since these computers are on the network, it enables faculty to access any material on the web. C&C also deployed a web storage server for faculty. This web server runs Xythos software that allows users to store and share content. Faculty are able to upload and download their material in a secure fashion from anywhere. This service allows faculty to access and present their material without needing to carry any storage devices or portable computers.

In addition to the multimedia, the campus network was expanded in all classrooms. The wireless network now covers all classrooms. Classroom network ports were changed to dynamic IP. These two changes allow faculty to roam from room to room without having to remember or enter IP addresses.

**Faculty Training and Support:**

In an effort to have faculty familiarize themselves with the classrooms and technology available, C&C took the following steps:

- C&C created a virtual classroom tour with detailed technology instructions. Faculty can visit any General Assignment classroom and familiarize themselves with the technology available and with the classroom itself. This site includes a campus map, building maps, hall maps, and room floor plans. Faculty can view three different angled images in addition to a 360 degree virtual-reality scene of the classroom. Detailed technology information and instructions are also available for each room.

- A small meeting room was converted into a demo classroom with the same technology faculty would see in their classroom. As faculty come into our office to check out keys to access the media, they are encouraged to meet with classroom technologists on site and test their teaching materials in this demo room. Faculty can experience the media setup first hand. This allows them to utilize the technology in the classroom with ease during their scheduled classes.

- Faculty trainings are held once a quarter in two general size classrooms, as well as every lecture hall. Faculty are invited to attend a seminar with a Classroom Technologist and an Instructional Technologist.

- Phones were added to every classroom so that faculty can get voice assistance by a technologist.
Technical Overview

The Extron System 5-IP is a multimedia controller switcher. It switches between the various video and computer inputs and provides audio control. This system is also a web-server. It houses software called IPLINK and has enough storage for basic webpages. SIS scripts are written and uploaded to provide the commands behind the HELP alerts, LAMP HOURS warning, and PROJECTOR DISCONNECT alerts. These alerts are sent in the form of emails to alias email accounts. Emails are automatically forwarded to staff and cellphones on duty. This makes it easy to redirect alerts if any staff member is unavailable.

In order to expand the networks, 100mb Cisco 8-port switches were installed in every classroom. These are manageable switches that provide connectivity for the following:

- Extron System 5-IP with static IP number for remote login
- Computer in classroom with static IP number for remote support
- Port for laptop on dynamic IP
- Wireless network access point
- Port for IP videoconferencing device on static IP
- Expansion Ports

Timeframe of Implementation

The Extron System 5-IPs were received in August 2004. All units were installed and operational by the end of September. During the same time Communications added phones to classrooms and Network Operations expanded the network.
Customer Satisfaction

This investment in UCR's "instructional infrastructure" has yielded positive benefits: in our Fall 2004 survey, 98% of instructors responded that UCR's available classroom technology either "Completely" or "Mostly" met their pedagogical needs. Following are comments about the new controllers:

- “I really like the new "integrated" box to control things. I used the HELP button once and response was great!! Thank You.”
- “Good improvements this year”
- “The HELP button was great! The projector was dead and I got a return call on the phone within a minute and somebody came to the class with a replacement projector very quickly. Bravo!”
- “The help button was extremely helpful and the assistance was great. I was very glad the help button was there. Great idea.”
- Everything was great and when we had a problem, the Media Services resource was very helpful. We did use the help button once and received instant assistance.

Until recently, most single point of control devices were limited to expensive touch panels. These touch panels were delicate and difficult to configure. Companies had to be hired every time we needed to change a device such as a VCR or DVD.

The Extron System 51P allows C&C to easily configure the controllers. C&C Multimedia staff quickly learned how to configure and deploy the systems.

UCR Smart Classrooms is the result of collaboration within C&C with oversight from the Classroom Technology committee. We define a Smart Classroom as a classroom with the following characteristics and technology:

1. LCD Projector Data/Video
2. DVD & VHS Player
3. Multimedia controller
4. Network supported and protected

As of Summer 2004, all our general assignment classrooms are Smart Classrooms.
Relevant URLs

Extron System 5 IP  http://www.extron.com/product/product.asp?id=system5ip&subtype=15


Classrooms website  http://cnc.ucr.edu/classrooms

Classroom Technology website  http://iclassroom.ucr.edu

Faculty web storage  http://ishare.ucr.edu

Web storage software  http://www.xythos.com

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