

Room 127 Dwinelle Hall Test Kitchen First Year Review



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Introduction

In 2011, Educational Technology Services (ETS) created an experimental classroom in Room 127 Dwinelle Hall, with funding from the Campus Committee on Classroom Policy and Management (CCCPM). The so called Test Kitchen was designed as a space for exploring active learning classroom arrangements, with a special focus on identifying design features that can someday be implemented more widely throughout general assignment (GA) classrooms. In terms of pedagogy, the term active learning covers a wide range of methods including: collaborative learning, problem-based learning, project-based learning, and more. For our purposes, what these methods have in common is more student engagement and participation than might typically be found in traditional classroom interaction patterns.

So far, the Test Kitchen has already been used by more than a dozen UC Berkeley instructors. This report reviews initial set-up as well as operational aspects of the Test Kitchen's first year. The report offers detailed observations on various ways in which the Test Kitchen has allowed instructors to explore innovative teaching practices in either short term or semester-long engagements. The documented experiences of classes using the Test Kitchen over the past year are already helping ETS staff begin to understand some specific ways in which GA classrooms on campus could be outfitted to allow for more active learning. In addition, the first year's experiences have allowed ETS staff to understand some of the new approaches that will be required in order to support these kinds of active learning classrooms at scale.

Design Goals

The Test Kitchen is meant to be a classroom where instructors can experiment with innovative teaching arrangements. In order for it to support such explorations, certain goals were used in designing the physical and AV/IT environments in order to support learner-centered instructional methods. Active learning classrooms make it easy for instructors to engage their students through the integrated use of media and collaborative learning activities. The room should facilitate diverse sizes and groupings of students, creating a flexible and supportive environment for a class to transition easily from large to small group activities. Examples of design elements that can enable instructors to move their classroom teaching beyond the traditional lecture include: an open floor plan, moveable furniture, portable writing surfaces, in-floor cable outlets, and prevalent display technology.

Renovation Process

After several months of design and planning, ETS undertook the renovation of Room 127 Dwinelle Hall in the summer of 2011. Because the room had previously served as a tele-conferencing classroom, some demolition and material removal was required, particularly the fixed bench seating, presentation area, and acoustic coverings.

The following is an overview of the renovation process that occurred during summer of 2011:

- Physical Room Renovation
 - Material Removal: floor carpet, fixed tables and presentation furniture, old A/V equipment, theater-style lighting fixtures, south acoustical wall.
 - Floor Coring: concrete holes created in five floor locations for infrastructure (power & data).
 - Window repair
 - Painting of south wall
 - Installation of new carpet tiles
 - Delivery & assembly of furniture; chairs, tables, podium, Huddleboards

Test Kitchen Physical Environment

The initial phase of renovation concluded in time for Fall 2011 classes. At this point, the Test Kitchen did not yet have a full AV/IT complement. However, the basic physical set-up was complete. The renovated space met the major design goals: open floor plan, reconfigurable furniture, and portable writing surfaces, and basic data display. Given that the people and furniture move freely in the space, special consideration had been given to the placement of electrical outlets in order to provide AC power for users' computing equipment (e.g., laptops) wherever they may set up. During the renovation phase, five holes were cored into the concrete floor in a distributed pattern around the room. In addition a central floor monument provided cabling outlet for both video and data. The following is an overview of the physical environment:

- Furniture: 32 chairs, 1 instructor chair, 16 tables, 4 Huddleboard sets w/wall-mounted rails, and 2 podiums - all on casters
- Lighting: Lutron system with twelve pre-existing grid fluorescent lighting recessed fixtures
- Finishes:
 - Wall - pre-existing acoustic panels with wooden chair rail
 - Ceiling -Pre-existing dropped ceiling with mineral fiber tile
- Floor: Carpet tiles by Shaw, Anderson Carpet & Linoleum Sales
- Window treatment:
 - 2" Levolor Blinds, Burris Window Shades
 - Manual Bead Chain & Clutch Blackout Shades, Burris Window Shades
- Entry Doors: Existing wood doors, added lever hardware for accessibility
- Internet Connectivity - Students: AirBears; Instructor can use AirBears or ethernet connections located in center floor monuments and A/V rack
- Electrical Power - Five floor monument style electric-power outlets

Test Kitchen AV/IT Configuration

The full AV/IT system for the Test Kitchen was installed prior to Spring 2012 in a second phase of work during the winter break. The following is an overview of the AV/IT environment:

- 1080p flat screen displays (LCD) suspended from ceiling mounts
- Computing devices – installed Mac Mini, instructor MacBook Pro &/or PC laptop upon request
- Wireless laptop and tablet display - Apple TV and Apple Airport express
- Control interface – AMX touch panel; iPad running AMX wireless control
- Speech Reinforcement – 2 wireless lavalier microphones
- Audio capture of lecture and students utilizing wireless microphones and 6 “choir mics” suspended from the ceiling
- Video capture capability: 3 Sony SD cameras
- Video media playback capability: Panasonic Blu-ray and installed computer

Room Users: Fall 2011

Inaugural use of the Test Kitchen began in August 2011, only days after the physical renovation and clean up were completed. The following courses and trainings made use of the Test Kitchen during Fall 2011:

- College Writing R1A, Prof. Sim Chiang
- ETS Seminar - Awakening the Digital Imagination, (enrollment consisted of faculty, instructors, academic support staff, library representatives and ETS staff)
- ETS Fall Faculty Orientations
- ETS AMX programmer training for engineers

Room Users: Spring 2012

With the AV/IT systems installation completed in phase two of the renovation, the Test Kitchen was ready for its first full complement of academic classes in Spring 2012. The following courses and trainings made use of the Test Kitchen during Spring 2012:

- Sociology 185, co-taught by Prof Michael Burawoy & Laleh Behbehastian (ETS provided lecture capture and video-conferencing via Skype for this unique 'global' course)
- East Asian Languages 105, John Wallace
- Freshman Seminar, team taught by Vice Provost Cathy Koshland, Director Derek Van Rheenen, Chancellor Emeritus Carl Pister
- College Writing, Jane Hammons
- Seminar: Awakening the Digital Imagination, Bobby White
- Visiting Scholars Program, Sarah Nathe
- ES21AC, Victoria Robinson, project-based usage for 3 weeks
- ETS Trainings, meetings, orientations and dept tours
- SACUE, Student Advisory Committee on Undergraduate Education
- New Faculty Orientation on bSpace

Key Observations – Physical Environment

ETS staff members took careful note of the day-to-day experiences of the classes and trainings using the Test Kitchen. Informal surveys and interviews also provided more summative feedback from room users at the end of term. The following are some key observations about experiences with the physical environment during the first year.

Aesthetics/Ambience: A great many comments have been made about the “feel” of the learning environment, adding carpet tiles compared to most tile/linoleum floors in GA classrooms, portable writing surfaces, colorful, adjustable, and comfortable chairs and the mobility of all furniture was key. Students ‘felt’ the difference when entering the classroom. “Students loved the environment in all ways but particularly they seemed relaxed and very interactive because of the fluid nature of the room.”

a) Environment

- It was noted that the room environment including the ability to adjust lighting, open windows for fresh air and natural light, all played a role in the student interaction and focus issues.
- With the added ‘extra’ space planned into the design and layout of the learning environment, instructors notice how easy it is to move around the room and engage with everyone.

b) Lighting Options/Scenes

- Natural light was obtained by uncovering 3 large windows overlooking Strawberry Creek and the redwoods. Glass panes were replaced and frames refurbished.
- Faculty commented about and used often, the wireless iPad for lighting controls, on/off and dimming the room environment.

c) Furniture

- Students that have space for laptops, texts and other materials they need or want on hand, work more efficiently and are also clearly more comfortable (tables vs. small chairs with tablet arms).
- Flexibility and efficient furniture that is mobile is a huge factor in facilitating discussions and exercises that would not have happened in a standard GA classroom.
- Depending on the class size, the ability to ‘nest’ furniture was very important rather than having furniture in the way for smaller sized classes. We often found tables and chairs neatly pushed to the sides of the room for this very reason.
- Having all furniture on wheels/casters was a requirement for engagement in the learning space keeping flexibility always in mind. Further was the need to have chairs that swivel, allowing students to move from side-to-side w/o having to move their whole chair.

Key Observations – Room Configuration

Room configurations changed frequently across classes and sometimes within a class. The built-in flexibility allowed instructors to be creative in adapting their room set-up to the activities planned for each session. As a result, there is no “one size fits-all” room configuration for the various classes taught in 127. Nor is there a standard room configuration that is required to reset at the end of each class. The instructor has the option of entering the learning space earlier than they would in a traditional classroom. In practice, the set-up time needed before class to arrange the room averages about 10-15 minutes, less if the instructor requests students to help.

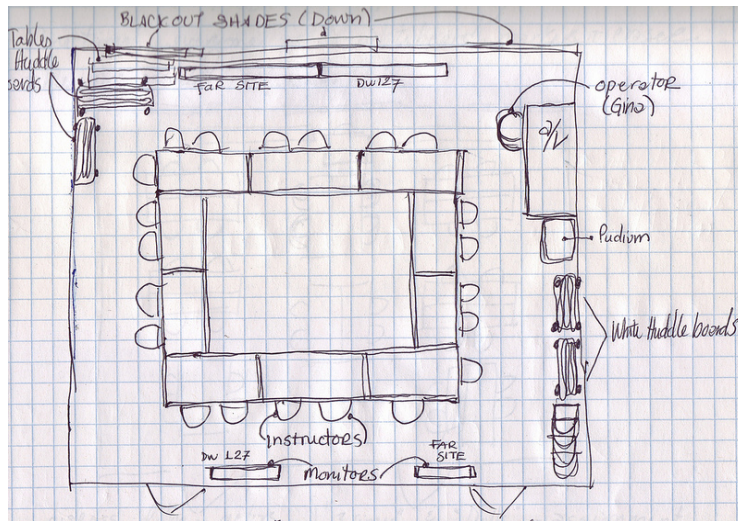


Figure 1. Sociology 185 video-conference/seminar layout.

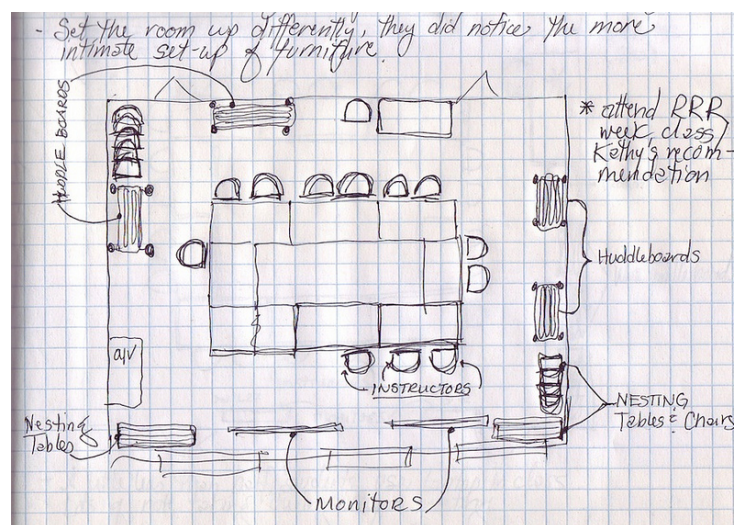


Figure 2. Seminar style layout used by instructors Koshland, Van Rheenen and Pister.

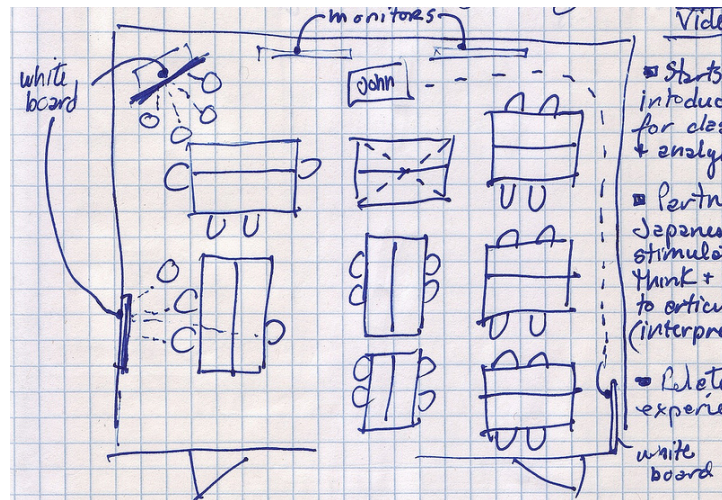


Figure 3. Full class seating for 32 students: video viewing & white board activities
 Instructor: John Wallace, EAL 105.

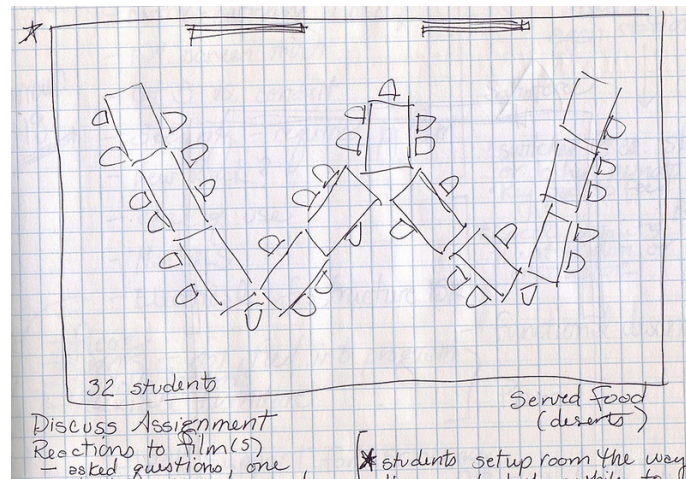


Figure 4. Student-led room set-up for EAL 105.

The following are some key observations about room configurations tried out during the first year.

- A number of instructors reported that the pre set-up time provided a social opportunity between the students and instructor arranging the room:

“I engaged the students in figuring out what the best configuration would be for the various things we might do in class . . . they had an archive of arrangements to refer to and would suggest based on past experience and what had worked best.”

- If the class was fully enrolled (32 students) and the class met for 50 minutes, it took too much time to reconfigure the room more than once – better to have an hour & a-half or more, to fully take advantage of re-setting the room for different activities.
- Smaller, seminar-style classes typically arranged the room in a ‘square’ configuration so that everyone faced each other for ease of discussion and collaboration.
- Presently we allow a 30-minute pass through before the start of each class. This allows time for the students to ask questions after class, while also providing the next instructor time to come in and set up their classroom environment and test media sources.
- Some instructors learned to map out their room configurations based on the activity taught, would either draw the configuration or display it on a monitor, and then the first students to arrive would configure the room/furniture.
 - “. . . as a total experience the mobility of the furniture was a huge factor in facilitating discussion and not just discussion, but made some exercises possible that I have never been able to do before.”
 - “Having efficient furniture that can be moved easily and “sized” for an activity beats scooting desks together and moving them apart any day. When students have space for laptops, texts and other materials they may need or want on hand, they work more efficiently and are also clearly more comfortable.”

Key Observations – Student/Instructor Engagement

The following are some key observations about how students and instructors interacted during the first year.

- With the added ‘extra’ space planned into the design and layout of the learning environment, instructors notice how easy it is to move around the room and engage with everyone.
- In a typical general assignment (GA) classroom, the technology is located in the front corner of the room forcing the instructor to be tethered to their laptop. The Test Kitchen allowed the instructor-student engagement to be centered, equal distance to all students and wirelessly.
- More than one instructor noticed the difference in engagement among students when working in small groups:

“I would say they (students) definitely paid more attention and seemed more accountable for good responses and engagement with each other in 127.”

Key Observations – Portable Writing Surfaces

The Huddleboard portable writing surfaces proved to be very popular. The following are some key observations about how students and instructors made use of them.

- Both Instructors and students used the portable white boards in virtually every class.

- Huddleboards are lightweight, also easy to move, use, and hang in different parts of the room.
- The use of the Huddleboards varied from putting up notices to working in small groups and/or reporting and presenting back to the class.
- Conversations took place in small groups either ‘huddled’ at the boards/stand or using the portable boards directly at their tables – often using more than one board at a time.
- Of note was the observation that students took “ownership” of their content/boards and felt freer to add/edit comments.
- Most instructors’ felt that they had to learn “how-to-use” the huddle boards and observed more student collaboration, “I could watch students *as* they built their ideas rather than just hear the result (as when they would answer a small-group question or so on).”
- “The Huddleboards were very useful for small group activities, allowing these small groups to report back to the larger group quite effectively. They are also easy to move, use and hang in different parts of the room.”
- “. . . using the Huddleboards for group work students can literally group around the board, hold conversations that don’t leak over onto the next group. Sometimes students used more than one board and could pull forward and push back the board that was most or least relevant to the presentation of their findings or discussion.”
- “Simple technology at its best, white boards that can be taken to tables and hung on walls! Brilliant.”
- “Watching them work, which is possible when they are huddled around a white board with everyone writing and erasing and compromising on final language, etc., gave me insight into how they work with material.”
- “Students will sometimes get up and modify their written comments, erase something or add to it. They did this on their own, in part, I think because of proximity and also the comfort level of the room. They didn’t have to walk to the front of the classroom as they would for a chalkboard.”
- “I don’t think I have used these nearly as well as I wanted to, but I loved trying and would definitely try to hone my skills on building exercises around these white boards.”
- And most notably: “The Huddle board can remain in their (students) “group space,” so what is written on it has more permanence and students seem to take some ownership of the work they’ve done. A chalkboard at the front of the room seems always to belong to the teacher, no matter how it is used.”

Key Observations – AV/IT Display Technologies

As the experiences during Fall 2011 confirmed, AV/IT technology is not a fundamental necessity for active learning. Still, the rich and varied use of technology during Spring 2012 revealed interesting ways in which media use can interweave with active learning activities. [The AV/IT system installation was completed in time for Spring 2012.] The following are some key observations about how students and instructors used the AV/IT display technology.

- Instructors often used more than one laptop for display -- their own and/or any combination of the room's laptops, installed computer or student's computer.
- Many of the end-users displayed multiple presentations in class on more than one monitor. There appears to be a trend towards wanting to display different images at the same time.
- For some classes, additional portable a/v equipment was brought in, specifically a document camera (requested as a permanent addition), a large screen, projector on an A/V cart, and an HD video recorder used by the instructor to review her teaching practice/performance.
- Room control was a toss up, both AMX and iPad were used equally though in the Web capture class, one has to use the AMX control panel to set up camera angles and for confidence monitoring – this is not possible on the iPad.
- The location of the two ceiling-height monitors came up more than once in conversation with both the instructor and students, the preference was to lower the monitors for better viewing angles/site lines.
- Observed at certain times of the day and depending on the weather, (south facing) sunlight washing/reflecting off wall mounted monitors, laptops, as well as reflections from the overhead lights on the whiteboards and laptops.
- Other sightlines were experienced when viewing the two large monitors on stands especially when trying to read subtitles and having 32 students in the room. Moving chairs around helped with this issue but it may continue to be a problem. Adjustments were made throughout the semester on an as needed basis to improve sight lines for various activities.
- Comments from instructors came up who like having the option of one large data projection display (in addition to the 4 large monitors).
- At least two of the classes required students to bring laptops or mobile devices for interaction and collaboration in the class.
- Project work - Wikipedia Assignments: The instructor broke her class up into groups and met on three Fridays. Instruction included the uses of Wikipedia, how to edit and add content - used all monitors but needed to increase font in order to read from the Internet site.
 - “Sometimes I had a student’s computer hooked up, along with mine, and then used the in-class computer to just expose a steady Twitter stream as a background. Very useful.”
 - “. . . we always had our bSpace site (learning management system) projected onto the screens to make certain that the class was all on the same page with assignments, resources and the use of forums.”
- Hybrid courses - a few classes used popular social media network sites to deliver information, chat and communicate outside of class time. Blogs, Twitter, Facebook and others were used to connect and collaborate with sister courses being taught on other campuses and in other countries.

Wireless Technology

- About half of the instructors gravitated toward the iPad for room control. It's wireless, and instructors enjoy not being tethered.
- Wireless Internet access was successful for all end users who taught this year aiding in all respects to the flow of instruction for teaching and learning.
- Observed instructors trying out the wireless keyboard and mouse sometimes for the first time – range limits to about 15'.
- The Test Kitchen allowed the instructor to be centered, equal distance to all students.
- A couple of instructors have piloted displaying a Mac laptop wirelessly using AppleTV. This has added a fourth computer option for some who are using multiple displays. It adds to the flexibility of the room and ease of set up.

Webcasting

- One class was webcast in Spring 2012, while cameras and system were in place, capture agent, post production workflow and programming needs were not tested and reliably working prior to the start of classes. We had to change the process and method of capture to be able to post the class in a timely manner.
- For this type of activity, webcasting, we had to have staff involved to control the camera shots and monitor signals.
- Although we hoped that webcast records could be operated by the instructor or someone in the class, this class was too complex to expect someone new to do the video recording. Four students from the class were trained, and each operated the system for several classes. For consistency, it was determined that one person should do all of the camera work to ensure smooth operations. ETS provided a staff person. The trained students assisted with the Skype connect and audio.

Video Conferencing

- “Skype” mode on AMX makes collaboration easy. The two large monitors lend themselves to video conferencing--far site and materials on one/near site on the other. Three cameras cover all areas of room. Camera presets allow for quick camera changes based on room configuration. Using Skype from installed computers allows for hard wired connection that is more reliable and stable. Ceiling microphones pick up participants' talk within the room.
- The Polycom video conferencing unit is antiquated, but ties in well with the standard definition quality of video technology currently installed in the room. During the first year, only Skype was utilized for this purpose. It proved quite adequate.
- More reliable video-conferencing tools might be worth consideration. Using Skype can mean that you're susceptible to dropped connections.
- Blackout shades on the windows were used for the Skype class.

- “On Wednesdays we Skyped in people from all over the world. They appeared on two screens and we (the class) were on the other two screens.” - Sociology 185 participant.

Key Observations – Room Control System

Easy automated control of classroom AV/IT systems has been a major focus of ETS support and services in the general assignment classrooms over the past decade. The Test Kitchen presents an ongoing opportunity for ETS to look at the control requirements of the future classrooms where the display options might greatly increase. The following are some key observations about user and support experiences with the control system during the first year:

- For such an unprecedented room with its array of display technology, a traditional and thorough needs assessment process was not possible prior to the initial technology implementation. Instead, ETS treated the control system programming more as a work-in-progress. Program development proceeded iteratively in response to user needs and experiences during the semester. This agile approach sometimes led to timing issues in terms of testing. Nevertheless, the control system matured well.
- With an interest in how such technologies might someday be taken to scale on campus, ETS was determined to leverage the types of technology that is already in place on campus. Unlike personal computers, control system hardware can be expected to last a decade or more. Any large scale effort to modernize the classroom to a state-of-the-art active learning space will need to be based on some amount of re-use of existing infrastructure.
 - Recycled technology was utilized in many cases in the Test Kitchen.
 - The AMX NI-3000 controller was 5 years old
 - A recycled standard definition camera system was employed
 - An older Polycom video conferencing system was installed
- iPad control was a new frontier in terms of control systems programming. Providing secure access to controllers from tablets is key area of interest for ETS. This first experiment with wireless control in the Test Kitchen has been very valuable. Someday we hope to support tablet and even smart phone-based wireless room control on campus.
 - Issues have persisted with iPad control, namely loss of power due to users failing to charge the unit and loss of connectivity with the AMX wireless access point (WAP).
 - Because the camera preview is not available on the iPad control panel, camera controls are limited to push-button functionality without visual feedback. The system has been programmed with the capability to show cameras on the installed monitors to facilitate camera control, but certain situations preclude users from utilizing this feature. The wired 12-inch controller is the obvious alternative.
- The experimental nature of the room led to much trial-and-error when it came to finalizing the initial build of the control system. Many weeks were spent changing basic and advanced functionality. Iterative testing led to extensive tweaking and extended

support needed in the room until users were comfortable and the system was fully stable.

- GUI design was created with a similar aesthetic to the GUI designs currently deployed across campus. Functionality is drastically different because of the nature of the room.
 - There are many changes possible in the future, including implementing a GUI design that utilizes the room's floor plan as basis for control.

Key Observations – Room Support

The following are some key observations drawn from ETS staff experiences in supporting the Test Kitchen classes.

- Fall 2011, the first semester of use, required more hands-on support than originally planned for however this was due to two 'edge-case' classes. One that was captured and webcasted, the other requiring more set-up/down time because of a fully enrolled class of 32 students and the instructor experimenting with different room set-ups.
- ETS has dedicated support staff available for the start of each class for the first 3-4 weeks of the semester. Most classes were self-supporting after two weeks.
- Year one, the identified staff technologist from ETS (Gina Gaiser), communicated each semester with the ETS engineers, post-production staff related to capture & delivery modes, and AMX programmer for end-user control panel requirements.
- For webcasting, ETS had to have staff involved to control the camera shots and monitor signals.
- Many of the end-users were displaying multiple sources in class on more than one monitor. This appears to be a trend as a few of the instructors coming into the program for Fall 2012 are also requesting the ability to display more than one source at a time.
- ETS provides mandatory room orientations for instructors prior to the start of the semester for those teaching in the Test Kitchen that includes furniture use & layouts, Huddleboard usage, window treatment options, technology, security issues and room guidelines.
- Maintenance including cleaning and room checks, technology repairs, replacement & installation, must be scheduled and a requirement of the new learning space for optimal performance.
- Currently, ETS hires students to do testing and cleaning once a week (i.e., approximately 25 hrs./semester).
- Only abbreviated testing was possible before the start of Spring semester after the installation of AV/IT equipment. Lesson learned: anytime changes are made to the AV/IT or room control systems, thorough testing must be done.
- The first year required more hands-on support than perhaps originally planned for. We had dedicated support staff available for the start of each class for the first 3-4 weeks of the semester. Going forward, it's our desire to have the instructor 'conducting' his or her own class more independently.

- We scheduled two ‘edge’ case classes Spring semester. One of those classes truly pushed the limits of the installed technology. The other taught us a lot about the impact of a fully enrolled class (i.e., 32 students) with an instructor who applied active learning principles that required flipping the room within a 50 minute window of class time. For the latter, ETS recommends 1 ½ - 2 hr class when enrolling 32 students and applying active learning principles.
- For now, we confirmed the need to have a 30-minute window between classes allowing instructors time to reconfigure the room and test their media sources. Scaling this principle out into GA classrooms will not work however; we have a 10-minute pass through. What is recommended for instructors who are familiar with student-centered learning is to adopt creative ways to plan their curriculum and use their students to help set up the room. Instructors soon learn the advantage to doing this.

Next Steps

During Fall 2012 semester, Dwinelle 127 is seeing use by instructors from East Asian Languages, College Writing, Classics, Mechanical Engineering, Physics and Theater, Dance & Performance Studies. The following are some of the areas on which ETS will focus attention for Fall 2012.

- Instructors who have applied to use the room are requesting early access time in the room to become more familiar with it before the semester start; testing out various room layouts, become familiar with the furniture, Huddleboards and technology. We are encouraging them to schedule accordingly with us.
- Instructors new to active learning are very interested in gleaming more from other experienced faculty who have taught in the “test-kitchen.” ETS will look for ways to build interaction and community between old-timers and newcomers.
- ETS is partnering with the new Center for Teaching to plan joint meetings (e.g., brown-bag, panel discussion) focused on best practices and real experiential applications of student-centered learning.
- ETS hopes to provide mock-up room layouts for instructors to help them see the range of possibilities.
- ETS will continue the mandatory room orientations prior to the start of the semester for those teaching in the Test Kitchen.
- Maintenance (including cleaning and room checks, technology repairs, replacement & installation) will be scheduled and made into a more formal requirement of the new Test Kitchen, for optimal performance.
- ETS staff will continue to observe classes throughout the semester and document best practices.
- ETS plans to continue to update the room’s technology, as needed. Possible areas include:
 - Install HD video technology
 - Upgrade the video conferencing unit
 - Wireless note-taking technology (e.g., LiveScribe)



- Find better wireless video technologies
- Install a data projector and wall-mounted screen

ETS will also continue to share successes and lessons learned with our partners and with the campus community at large. The ETS Staff in Action page (<http://ets.berkeley.edu/staff-in-action>) on our web site was recently created as a new venue where we can get out the word quickly about the dynamic participation of our staff in a wide range of efforts and collaborations such as the Test Kitchen. Check it out.