Learning Spaces Advisory Committee Report

The Learning Spaces Advisory Workgroup was tasked to examine the evolving role of technology and instructional space design in campus learning spaces and, specifically to provide input on four related topics.

- Improvements to existing classrooms and other learning spaces to facilitate innovative educational strategies, including active learning and technology-enhanced techniques
- The design and use of purpose-built innovative classrooms such as Social Ecology 101
- The design of new, larger scale instructional spaces
- Technological improvements and innovations in other campus instructional spaces, such as discipline-based laboratories and study rooms

The committee met twice, once last year and once this year, and, during the intervening interval, gathered information and impressions that are summarized in the recommendations below.

The perspective informing all the committee's observations and recommendations is the recognition that the range of activities actually involved in student learning often do not fit well with the physical and temporal constraints of classrooms that have been built, maintained, and scheduled to support teacher-focused instruction. This perspective incorporates the idea that active, engaged learning is greatly facilitated when at least some time spent in more traditional methods of instruction are replaced by methods in which small groups of students (generally, no more than seven) communicate, collaborate and support their individual and collective efforts.

The observations and recommendations of the committee are grouped in the following eight areas:

- Classrooms Designed to Support Small-Group learning
- Improvements to Existing Lecture Halls
- Improvements to Existing Smaller Classrooms
- Improvements in Existing In-Classroom Technologies
- Increased Flexibility in Classroom Scheduling
- Importance of Training and Support
- Need for a Systematic, Funded Classroom Review and Rejuvenation Process
- Improvements to Other Spaces to Support Learning and Group Interaction

The section focusing on each of these eight areas includes both observations and **specific recommendations that can be easily identified by this type face**.

UCI Context

The eTech Fee made possible the classroom technology refresh process, which is just completing its current five year cycle. This refresh has greatly improved the usability of UCI's formal teaching spaces. With this cycle complete, almost all of the General Assignment classrooms[1] are equipped to provide reasonable audio-visual equipment for teaching support: in the minimum configuration, there is a computer, the capability to connect a personal laptop, data projector, display screen, microphone, and associated ancillary equipment. This milestone marks a good time for the campus to evaluate two other aspects of our learning space needs: support for active learning in formal classrooms and enhancing the educational utility of interactions that occur in less formal environments. The importance of both of these topics grows out of the idea that, while both solitary study and lectures will continue to provide important learning opportunities in a university education, many important opportunities for learning arise in small group interactions – both those in a classroom setting, facilitated by an instructor, and those that occur outside of the classroom, without or with participation by an instructor. Small group interactions are important both because they often involve learning that is more "active"[2] and because, while working in groups to answer questions, explore issues, or carry out projects, students develop teamwork skills essential in their personal and (as recognized by employers) professional lives. Against this background, many of the committee's recommendations will be focused on improvements that facilitate interaction and learning in small groups.

Group interactions can be as straightforward as in-class discussions. With more or less guidance from an instructor, discussions require learners to think critically and logically to evaluate their own positions and those of others. Such discussion makes few demands on the classroom environment beyond good acoustics that allow those speaking to be heard easily by everyone else in the room. (The parliament classroom, part of the new LINC building at Oregon State University[3], is an interesting example of a larger room, with a capacity of 176 students, designed specifically to facilitate large-scale, in-class debate.) However, many of the active-learning advantages of in-class discussion are reduced as the class size increases, since this dilutes the opportunity for any particular student to be actively involved and thus increases the possibility that students will slip back into a more passive learning mode. To counter these problems many instructors find it useful to divide large classes into small groups with the instructor(s) moving between groups to facilitate interactions. This approach is often used for problem solving activities, but it can also work well for discussions and as a way for students to clarify readings or other material. Unfortunately, most of the larger classrooms at UCI do not support these activities particularly well. Indeed, the general rule is that these classrooms often they impede these activities.

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[1] http://www.classrooms.uci.edu/techrooms.html

[2] Bonwell, C.; Eison, J. (1991). Active Learning: Creating Excitement in the Classroom AEHE-ERIC Higher Education Report No. 1. Washington, D.C.: Jossey-Bass. ISBN 1-878380-08-7.

[3] http://oregonstate.edu/ctl/sites/default/files/linc_12parliament.jpg

Classrooms Designed to Support Small-Group Learning

One summary of the attributes of classrooms that support the interactions of small groups in a large class setting was provided by Adam Finkelstein of McGill University in a session held at the 2015 National Forum on Active Learning (AL) Classrooms. According to this summary the necessary features, in order of importance, are these:

1. Enough space & flexible furniture.
   Students should be able to sit in groups facing each other. Students and faculty need space to be able to move around. While not dictating pedagogy, room layout can create expectations about interactions.
2. Common notation space.
   It is important that the work of a group be visible to its members, the instructor, and to other groups. In most cases a whiteboard for each group and/or low-tech polling such as clickers or even just colored index cards will suffice.
3. Noise reduction.
   Even 20 or 30 students talking in groups can make hearing difficult; with one or two hundred, noise from other conversations can present a serious challenge. This has been a problem in SE 101.
4. Multiple screens
   Multiple screens can be useful because the different orientation of students facing each other in groups makes it difficult to view a single, central screen.
5. The ability to switch the content sources of the multiple screens.
   Beyond multiple copies of material presented by the instructor, the screens associated with each group can be set up to show material originating from devices belonging to group members. In SE 101, the instructor can also choose to make the material generated by one group available on all of the screens.

SE 101 is an example of a classroom that includes all of these features because it was designed to support small-group learning. A growing number of universities around the country have been exploring the possibilities of classrooms with this level of physical and technical features both for small-group interactions and instructional laboratories. One leader in this area has been North Carolina State University, which developed the **S**tudent-**C**entered **A**ctive **L**earning **E**nvironment with **U**pside-down **P**edagogies (SCALE-UP) architecture[4]. Adapting this approach, the University of Minnesota built a new building with fourteen active-learning classrooms having capacities between 27 and 126.[5] These projects use a design that, as illustrated in the photo, is standardized and modular, with 9-student tables forming the core. In the five years that Minnesota's building has been in use, its classrooms have become quite popular. More than 285 instructors, representing roughly half of the departments, have taught in these classrooms. Over half of the students in the university have taken at least one class in one of these rooms. There is an interesting, if somewhat promotional, video discussing how these classrooms can be used and student reactions at https://www.youtube.com/watch?v=lfT_hoiuY8w.

[4] http://scaleup.ncsu.edu/

[5] http://www.classroom.umn.edu/projects/ALCOverview.html

Another important application of this approach is in teaching laboratories. MIT's TEAL project[6], which also used the SCALE-UP architecture, demonstrates the advantages of this approach in Introductory Physics.

Because classrooms specifically designed to support small-group learning are still new, it is difficult to predict the potential of this technology-intensive approach to classroom design, both for individual classes and UCI as a whole, without more first-hand experience. For this reason, the committee recommends that UCI continue to develop spaces, such as SE 101, that allow faculty (and students) to explore the pedagogical possibilities enabled by bringing active learning and other pedagogical innovations into UCI classrooms. The main disadvantage of the high-tech-classroom approach is that their per seat costs is substantially higher than that of more traditional classrooms. For that reason, the committee strongly recommends that the campus also continue to explore a range of options that includes looking for ways to retrofit existing classrooms, as discussed in the following sections, so that they provide at least some of the supports for small-group learning given in the list above.

Improvements to Existing Lecture Halls

For large lecture halls, there are two changes that would increase the flexibility of these spaces and thus facilitate small-group interactions. **Breaking up the unbroken block of 13 or more seats in the middle section of most large lecture halls by including an additional aisle would facilitate access to students by instructors, not to mention students, thus making the process of filling and emptying the classroom more efficient.** Of course, doing this will involve removing seats. Although it probably does not make sense to trade a 10% reduction in seats for improved access to students by instructors in every lecture hall, the advantage for classes in which instructors wish to make use of small-group activities should justify making this change in some large lecture halls.

Including seats that rotate, so that students in one row could easily interact with students in a second row not just a student on one side or the other. An excellent example of this concept is Room 1210 in LeBaron Hall at Iowa State University. This lecture hall has a capacity of 363 students. Photos of this space along with floor plans are available at https://www.fpm.iastate.edu/roomscheduling/room.asp?room_id=135 (click the buttons below the photo to access different views). As these photos show, there are two rows of seats on each stepped level, and the seats in the front row rotate to allow students in the two rows to interact.

A third useful enhancement for large lecture halls would be to add additional, smaller screens on the side and even the back walls. These would mirror the main display screen and be visible by students and working groups, who were not facing toward the front of the room.

[6] http://icampus.mit.edu/projects/teal/

Improvements to Existing Smaller Classrooms

UCI already has many smaller classrooms with movable furniture, a feature presumably included to increase their flexibility. Unfortunately, several aspects of the configuration of these classrooms make them more suitable for lecture-format classes than for classes using small-group activities. As shown in the picture (this is SSL 145), one problem is that, when the desks in these classrooms are organized into groups, the space is so crowded that there is not enough space for instructors to circulate easily between the groups. There is also a lack of common notation space. The main whiteboard is behind the podium and mostly blocked by the display screen, making it unsuitable as a common notation space. There is a second, small whiteboard (not visible in this photo, but off to the left), which could be used by two of the groups. However, there is a lot of empty wall space that could be put to use as notation space if more whiteboards were installed and students could get to them easily. Finally, as the photo illustrates, viewing information projected on the single display screen is also difficult for many of the students in each group.

The first of the problems noted above could be eliminated if some of the seats in this room were removed (10%-20%). As noted in the discussion of lecture halls, this is probably not a step that, at least initially, would make sense in all rooms with movable desks; however, the committee strongly urges that it be tried in some. **In addition, adding colored markings on the floors in these rooms to indicate where the desks should go in lecture-oriented versus group-oriented arrangements would increase the actual flexibility of the classrooms by facilitating the process of rearranging the desks, which must be done in the passing period between classes.**

Continuing down the list given above, **it would be easy and quite desirable to add additional, small white boards on the walls or even simply paint them with "chalkboard paint."** One possible concern about this step might be the cost of cleaning these additional white boards; however, with appropriate classroom etiquette, this can be minimized. Many of the rooms with movable desks are, like SSL 145, boxes with hard surface floors and walls and low ceilings. Although they typically have acoustic tile on the ceiling, these spaces can be noisy when many people are talking rather than a single instructor. **Retrofitting more sound-soaking materials into these classrooms would greatly enhance their utility for small group activities. Also useful would be adding LCD displays, on the walls, to mirror the material projected at the front.**

Other, More General Considerations

In addition to these specific recommendations for how larger and smaller classrooms might be reconfigured, the committee had several more general recommendations for how to make teaching and classrooms more effective. These recommendations call for further improvements of classroom technology, changes in scheduling of

classrooms (to make both classrooms and non-traditional spaces more easily available for academic purposes), training of and ongoing support for instructors, the establishment of a retrofit process for classrooms and teaching laboratories, and principles for evaluating teaching and learning spaces.

Improvements in Existing In-Classroom Technologies

The committee discussed two ways to improve on the current standard of technology in classrooms: improved wifi coverage and automatic systems for tracking the instructor in video recordings.

I-Clickers, which use a dedicated communication system, have functioned quite successfully on campus for the last decade. However, as more students carry wifi-enabled personal devices, there has been increased pressure both to make more use of the additional response flexibility of those personal devices and to help students avoid the cost of having to purchase dedicated clicker devices when they already own and bring to class, phones, tablets, or laptops. **However, for wifi-based systems to work well, classrooms must be equipped with access points that are sufficient to allow each student to connect at least one personal device. Although this level of upgrade is neither trivial nor cheap, it has been done successfully and probably will be needed for most, if not all large classrooms in the near future. It may also be important for the campus to consider proactively standardizing on a single, personal device based polling system.** For example, a campus site license for an application such as Poll Everywhere[7] (presenter & audience versions) could help standardize usage and enable students to pre-enable their devices for all classes that might wish to use this technology. An important feature for any system considered for adoption is that it allow instructors both to embed surveys into their PowerPoint presentations or simply to announce them as appropriate.

The UCI Replay system[8] has been used successfully in many classes to record lectures. However, this system works best for lectures built around the use of PowerPoint or other similar presentations. **Replay recordings are of less value for classes where the instructor creates content within the class, for example, by writing on the whiteboard. There are several technology improvements that might reduce this problem. One would be to use devices that capture, both for display and recording, material written by the instructor on a whiteboard or console panel. A second would be video-recording technology that tracks and records the instructor as he/she does whatever they are doing. The committee recommends that the campus explore both approaches, in different classrooms, to get a better sense of what works well for our instructors and classes.** An important side benefit of any system that simplifies and improves the process of recording classes is that instructors could also choose to record classes for the purposes of self-review or more systematic, continuing pedagogical development. For example, based on when it is convenient for them, instructors could choose class session to record and send to a consultant in the Center for Engaged Instruction[9] (CEI) for consultation purposes. This makes the consultation process more convenient for the instructor and reduces/eliminates the need for CEI staff to physically go to the room to film the class.

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[7] https://www.polleverywhere.com/

[8] http://replay.uci.edu/

[9] http://cei.uci.edu/

Increased Flexibility in Classroom Scheduling

The classroom technology refresh process has helped to standardize classrooms on many dimensions other than capacity, which definitely has made scheduling easier. Many of our recommendations, unless applied broadly, which would be expensive and would still take time, will undermine the current level of standardization. This was an issue in Winter quarter with SE 101. (As a general assignment classroom, classes were assigned to it based on its capacity and then had to be reassigned when their instructors were not interested in using the kind of space it offered.) **While we acknowledge that the current classroom scheduling process is complex and difficult, the committee recommends that systems be developed to characterize more completely both classroom spaces and the teaching requirements of courses so that the scheduling process is better able to match course offerings to appropriate classrooms.** A system that allows better matching and more scheduling flexibility generally, would, the committee believes, lead to the availability of more useable classroom space without additional construction.

There are several situations in which it would help if classes could easily schedule larger spaces during finals week and possibly also several times during a quarter. This arrangement is already used for large lecture classes, split into multiple sections, for which it makes sense to administer a single final exam at one time to all of the students in the class. However, this arrangement would also be useful for large "flipped" classes, for which lecture material is delivered online and the in-class sessions emphasize small-group, active learning. To facilitate this pedagogical approach, it would make sense to split a large class, of several hundred students, into smaller groups for the in-class sessions, which could then be held in smaller classrooms better structured for this purpose than a standard, large lecture hall. However, in this case also, it would be beneficial to be able to administer tests to all of the students in the class at one time and in one place. For both of these and other situations, **it would be useful if it were possible to schedule testing sessions either in large spaces not usually used for instruction – e.g., large rooms in the student center, Bren Arena, or even some of the large dining spaces – or in the large lecture halls on weekends.** Currently, there are financial and/or administrative obstacles that make these scheduling alternatives difficult, if not effectively impossible, even though they would serve the academic needs of students and allow campus classroom resources to be used more efficiently. A similar problem is faced by instructors with exams scheduled on Monday of exam week, who want to respond to the expectations of students that review sessions be offered between the last class and the final exam. **Ideally, there would be a system in place that would facilitate the intermittent scheduling of large spaces; either ones not normally used for academic purposes or normal spaces at unusual times.**

Importance of Training and Support

After arriving in the classroom, a typical instructor might have to log in on a classroom console computer, load up a PowerPoint presentation and other audio/video materials, start-up the Clicker system, and initiate a Replay recording. Each of these operations requires the mastery and correct execution of several steps involving different programs, each with its own interface and quirks that are often subtly different from those available on the computers faculty use outside of class. These steps all need to be carried out correctly in the limited period between classes, a process that can be made more complicated when students also want to come up and ask questions. Even technology-adept faculty members report that this process can be daunting, and for those who are less adept it can be a real hindrance slowing the adoption of useful technology. If there are problems – e.g., a step

done incorrectly, malfunctioning equipment, or software on the classroom computer configured differently than that on the faculty-office computer where an operation was tested – at a minimum, there is frustration and class time is wasted, and, more seriously, teaching opportunities must be foregone or class recordings are lost. These issues will only become more important for advanced-technology classrooms, such as SE 101.

Simplifications to the start-up process should be explored because they would allow instructors to focus less on technology and more on teaching. Below we describe three approaches to making this process more manageable. One approach would be to reduce the number of steps required to complete all or part of the process. For example, there was definite interest in the possibility of simplifying the process needed to record video of a lecture, so that recordings would either be done automatically, based on the class schedule (distribution of the recordings would require subsequent action by the instructor, so that unneeded recordings would simply be discarded), or initiated by a single click. A more comprehensive solution would involve developing a system for the console computers in the classrooms that would allow an instructor to pre-specify, any time before entering the classroom, the applications and the associated files needed for an upcoming class. Once the instructor had logged in to the console computer before a class, this system would use the stored specifications to start up the specified applications automagically.

Even the comprehensive system described above would still not be able to deal with equipment malfunctions or other similar issues. A more complete, although probably more expensive, approach to solving the start-up problem would be to provide in-room technical support personnel for faculty who request it. McGill University trains undergraduates for this role. Since their assistance is typically only are required for the first several weeks of a term, they have reported (personal communication) that the budget is roughly $10,000 per term.

With or without any of these solutions, instructors need opportunities to practice with or, at least, try out the equipment that they will use in the classroom and receive instruction, if necessary, from technically proficient advisors. One concern often raised by faculty is the difficulty they have getting access to high-tech classrooms at times when there is no time pressure. This access is important as an opportunity to gain hands-on training with the equipment and procedures, to try out new improvements, or simply to practice in order to avoid mistakes when time is critical. **Since access to the actual classrooms can be problematic, it would be useful if there were replicas of the classroom podiums in mocked-up classrooms, or even interactive, audiovisual simulations, that could be used for training or for familiarization, practice, and experimentation.**

The need to provide faculty with support and training opportunities goes beyond classroom technology. As more spaces are built or converted to support active-learning, pedagogic training will become, if anything, more important. As David Langley, a researcher and leader in this area says, “Pedagogical choices trump room design.” Put another way, learning space choices invite/encourage/permit but do not compel/cause either specific pedagogical approaches or, more importantly, student learning. Using active learning techniques requires that instructors give up a good deal of perceived “control” within their classes. In an active-learning classroom, instructors have to recognize trouble spots and, instead of giving students answers, provide them with “nudges” that will get them back on track. Doing this well requires experience and insight. **First time instructors adopting active-learning methods will need extensive support, both to plan the overall course and individual classes. This kind of support is best provided through the services of an instructional development expert (examples of such services are given on the Instructor**

Resources page[10] of the CEI) or an experienced faculty colleague. More generally UCI would benefit from a culture in which instructors observe each other's teaching and share their successes (and setbacks). It is also critical that instructors understand that they will not be penalized for taking the risks that trying new pedagogical approaches for the first time will involve – if instructors feel that they might be penalized just for trying new techniques, if student assessments are not positive, then why should they try? More generally, it will help if the campus provides recognition and incentives to instructors willing to develop courses using these or other new methods. At the same time, it will be important to recognize that not all faculty will ever be comfortable making extensive use of active-learning approaches and that, even when active-learning techniques have been embraced, intervals, perhaps even entire class periods of lecture may still have an important place.

Using Technology to Create Linked Classrooms

Promising new technologies make it possible to link smaller classrooms into a larger, virtual classroom. So for example, a 500-seat lecture hall could be created by linking existing 400- and 100-seat lecture halls with the lecturer physically present in one of these rooms. Making the linkage between classrooms sufficiently seamless is a technology and human factors challenge that will require exploration. Although transmitting the audio and video from the originating lecture hall to the receiving lecture hall is relatively straightforward, allowing the students in both locations equal opportunities to ask questions and be engaged (with Clickers, etc.) might be a challenge. Certainly, the success of any plan such as this would rely on support staff to manage the link and perhaps also coordinate the communication between the rooms; this is not an additional task that should fall to the instructor. With these caveats, **the committee strongly supports exploring options to provide real-time links between instructional spaces since this technology could increase scheduling flexibility and allow existing classrooms to be used more effectively.**

Need for a Systematic, Funded Classroom Review and Rejuvenation Process

The committee applauds the new initiative announced in a memorandum dated 12/14/2015 and titled "Classroom Maintenance and Renewal Discussion" to both reinvigorate the program of classroom inspection and repair and to make the Office of the Vice Provost of Teaching and Learning the "programmatic owner" of the campus's general assignment classrooms. These are important changes, but the committee recommends that the mandate of this ownership needs to be expanded to include updating existing classrooms and that there needs to be consistent funding dedicated to this process. An example of such a program is that recently undertaken by McGill University. This program is reported (personal communication) to have annual funding of about one million dollars. Information about the organization and oversight of this program is available at https://www.mcgill.ca/tls/category/tags/mcgill-classrooms. This website also highlights some of the projects that were funded. Of particular interest is a webpage "Principles and Standards for Designing Teaching and Learning Spaces".[11] Linked to this webpage are three useful documents. The first describes the five principles for design of

[10] http://cei.uci.edu/instructor-resources/

[11] http://www.mcgill.ca/tls/spaces/principles

Teaching and Learning Spaces[12] that McGill developed by considering the items in the National Survey for Student Engagement (NSSE), a respected indicator of student engagement used by over 1450 universities across North America. Taken from this document, these five principles are

1. **Academic challenge**
   Learning spaces should allow students to actively engage with content and include a range of technologies that support multiple modes of teaching and learning.
2. **Learning with peers**
   Learning spaces should provide features that permit students to work both individually and in collaboration with one another.
3. **Experiences with faculty**
   Learning spaces should facilitate communication and interaction between students and faculty.
4. **Campus environment**
   Learning spaces should be consistent with the university's culture and priorities as reflected in the campus master plan, follow university design standards, and be designed with future flexibility in mind.
5. **High-Impact Practices (HIPs)**
   Learning spaces exist within a larger campus context; there should be an ease of transition between spaces so as to better support high-impact practices inside and outside the classroom.

The second linked document is a publication describing the research that went into the development of these principles and the associated standards and guidelines.

> Finkelstein, A., Ferris, J., Weston, C., & Winer, L. (2016). Research-informed principles for (re)designing teaching and learning spaces. *Journal of Learning Spaces, 5(1).*

The third linked document contains the actual classroom standards and guidelines that were developed at McGill.[13] This document includes both detailed descriptions of principled guidelines for room design, construction and/or renovation of formal learning spaces and a system for describing formal learning spaces to aid in room selection for specific teaching and learning needs. These guidelines, which contain much more detail than the recommendations made in this document, should be a useful starting point for any classroom construction or upgrade project.

Improvements to Other Spaces to Support Learning and Group Interaction

Although classrooms are often seen to be the focal point of the learning process, substantial learning takes place outside of the classroom. Supporting such informal interactions for commuter students, while they are on campus, is especially important, since, when they are away from campus, it is more difficult for them to reap the benefits that accrue from working and interacting with their peers. From this perspective, **the committee recommends that the campus emphasize the creation and maintenance of places for**

[12] http://www.mcgill.ca/tls/files/tls/principles_for_the_design_of_teaching_and_learning_spaces_2014_f.pdf

[13] http://www.mcgill.ca/facilities/design/standards

individual and collaborative studying, discussion, and other learning activities. This includes ensuring both that they are sufficient in number and also that they are available on the days (particularly, for example, weekends before finals) and times when students wish to use them. Also important is the type of space provided to students. Many of the current spaces are organized to support only individual or shared work that can be done quietly. Also, important, however, are spaces that support small-group interaction and collaboration based on discussion. As with active, group learning in classrooms, these spaces need some form of shared notation space: e.g., whiteboards or large screen displays that can be used to display information drawn from the internet or from student devices.

The committee also strongly recommends that the campus explore new ways to link together students in different locations that is made possible by recent developments in virtual meeting technology. Those linked in this way might, for example, be students in spaces on different sides of the campus or students on campus and commuting students at home. Of course, the use of this technology need not be limited to connections involving only students. The equipment (e.g., microphones, cameras) and software enabling such collaboration, sharing audio, screens, video, among students also allows communications with instructors, reference librarians, and others not physically present. An intriguing proposal to develop and try out this technology was recently recommended for approval by the Educational Technology Initiative (eTech) Advisory Committee. This proposal, from the UCI Libraries and the Office of Information Technology, calls for creating several Connected Small Group Active Learning Spaces:

> "UCI Libraries and OIT have jointly developed a proposal for changing existing group study spaces into connected small group active learning spaces by adding communications tools for remote collaboration and consultation as well as the types of technologies used in SE 101 to facilitate active, participatory learning within small groups. The communications tools will allow both participation at a distance by additional students as well as instructor availability, when suitably scheduled, for "office hours" or class activities similar to those for which SE 101 is configured.
>
> While a principal initial use of these spaces will be an enhanced form of the study/learning activities small groups of students already engage in, the space's communications capabilities open the possibility of connecting several of them, on a scheduled basis, into a combined classroom. The Libraries will assume responsibility for scheduling, monitoring and logging use. The Libraries and OIT will jointly conduct surveys and interviews of students using the facilities. The pilot phase of this project will involve five study rooms in the Gateway Study Center and Langson Library. Other obvious locations on campus include the Ayala Science Library, the Student Center, Campuswide Honors Program study spaces, and spaces in residential housing."[14]

[14] http://etech.uci.edu/initiative-summary-2016/

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