

The Space is the Message: First Assessment of a Learning Studio

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The Problem

Responsibility for support of technology in teaching and learning at the University of Missouri-St. Louis (UMSL) falls within the Information Technology Services (ITS) unit. Notwithstanding funding challenges, we have been systematically renovating classrooms in order to meet the demands of increasing campus use of technology in teaching¹. Upgrades have included desks and chairs as well as technological aids such as data projectors, instructor computers, classroom responders (“clickers”), etc. However, even classrooms with laptops are arranged in traditional configurations: instructor station at the front, student stations in fixed arrangements of desks in straight or curved rows. Figure 1 is a photo of a typical “technology enhanced classroom.”



Figure 1: A technology enhanced classroom

The growing body of recent literature² on new classroom design encouraged us to begin planning for a different kind of classroom. Given the positive descriptions of spaces at other institutions, embarking on the creation of this new generation of classrooms fell into the category of an investment that UMSL “could not afford **not** to make.” If other

institutions were improving their student outcomes or their enrollment because of these new classroom designs, UMSL needed to do so as well, if only to stay competitive.

In this paper, we describe the planning, creation, use and initial assessment of UMSL's first "Learning Studio"—a space that had to be immediately useful, but also unabashedly provocative and experimental. Even with a limited budget, we needed this prototype to guide our campus in evolving new approaches to learning that are appropriate to our context. We also needed a process as well as to demonstrate effect.

ITS has a long history of collaboration with the Library, and we jointly support computer workspaces in Library locations. The Library also has extensive wireless coverage and ITS initiated a laptop checkout program there some years ago. While we have not yet formally created a "learning commons" in the Library, there are many comfortable spaces that are used by students. The Studio initiative intended to have a more direct effect on pedagogy and learning.

Early Indicator

The Studio is an important harbinger of change on our campus—in our conceptions of teaching and learning and in our approach to development of physical space. We were struck by how the completed space itself challenged faculty and students to rethink their possibilities at UMSL and expressed our nascent cultural change. Our title³ is suggested by this student⁴ entry in the assessment blog:

“...This is my 2nd semester in this classroom, and every day, I like it more than the first. I feel that this classroom promotes a positive learning environment the second you walk in the door. No longer do we sit in a stark classroom, walls white, with windows that make a classroom feel like a prison. No longer are we confined to one, hard-seated desk. No longer do we stare at one chalkboard, with feet on tile floors. In this classroom, the mood is different. The warm walls and pictures, colorful carpet and welcoming couches beg to be noticed. Students sit where they choose, at group tables or individual tables...When you walk in the room, you want to learn... this room does not compare to any other classroom I've ever been in...”

This is a poignant affirmation of the “self-evident” effect of “attractive, well-designed, well-equipped contemporary spaces for teaching and learning” and the creation of “excitement and luster” in student and faculty achievement⁵. It also directly addresses our campus intent to increase recruitment, retention and engagement.

Context and Process

The University of Missouri - St. Louis is an urban public research university and one of the four campuses of the University of Missouri system. A relatively young campus

(about 45 years), UMSL has about 10,000 FTE students and some 15,000 headcount, a reflection of the “non-traditional” nature of our student population. We have a large number of part-time students, many of whom work full-time in addition to their studies. Our student body therefore spans a wide spectrum—from older adults returning to finish their baccalaureate or advanced degree, to MySpace-cruising “millenials⁶.” Their success contributes directly to the community—75% of UMSL graduates work and live in the St. Louis region.

We also need to increase overall enrollment, which is dependent on both recruitment and retention. This is fundamental to our mission⁷ as a land-grant university, but also important to our fiscal outlook. UMSL is not alone in these challenges—other authors⁸ have remarked on the obsolescence of facilities at other institutions as well as the need for enrollment increases.

As with many innovations, the impetus for new classroom design began with a few forward thinking people. Principal among them was Bill Klein, a colleague from the English Department who, following an established ITS model, organized a “Provost’s Forum” on Innovative Classroom Design. The Forum attracted over 60 interested faculty, staff and students; from it came a working paper⁹ that captured the characteristics of an “innovative” classroom.

Many authors¹⁰ have made the point that physical facilities have long life-cycles, and so planning has to be careful about many different factors, including operational costs. This advice is well taken, but because of our small budget and our intent to move quickly, we had to take a more lightweight approach that respected advice from the literature and managed our risks through:

- focus on a single classroom
- being explicit that this first classroom would be prototypical and experimental, and yet be disciplined about the planning and design
- use of the recommendations in the working paper and continued involvement of key faculty as resources in planning and design
- use of established principles and experience at other institutions
- being explicit about assessment of the usage upon completion

As Guy Kawasaki colorfully advises¹¹: “Churn, baby, churn...Innovation is not an event. It’s a process.”

One concern that loomed large from the start was finding space in which to establish the new classroom. As is the case on most campuses, UMSL has no “spare” space, especially of a size and accessibility that would be suitable for a new classroom. Taking an existing classroom out of use in order to convert it would also decrease our overall classroom stock. In a serendipitous development, the Center for Academic Development was in the process of re-organizing and the Director was intrigued and excited about the potential for re-purposing some of their space to create a different kind of classroom. ITS formalized the agreement with the Center in a Memorandum of Understanding to clarify

terms and conditions for future reference. The Provost supported the joint effort and we were able to proceed with planning to combine two smaller rooms into a single large room that would accommodate 30-40 students upon completion.

Design and Creation

The UMSL working paper¹² articulates several design principles, learning spaces:

- must be flexible to accommodate differences in teaching and learning styles, activities and content¹³.
- must also be social spaces that enable collaboration and interactivity during class time¹⁴.
- must also address creature comforts and ambiance because these can enable learning in significant ways¹⁵.
- their equipment, facilities, and furniture must be accessible to students and teachers. These learning spaces must also comply with regulations derived from the Americans with Disabilities Act¹⁶ (ADA).

Guided by these principles and the literature, ITS staff oversaw the overall implementation effort while continuing to involve interested faculty. We also selected a systems integrator¹⁷ with whom we had good experiences in other projects.

The System integrator helped immensely prior to actual usage of the room, on details such as lighting design and control, selection and placement of display technologies, including two data projectors on opposite ends of the room and a large format plasma display. ITS provided the firm with a list of preferred features in the AV system and the integrator provided options to meet most if not all the needs. ITS selected the preferred options based on prioritized needs and costs.

The instructor station has three displays, one of which is a Sympodium touchscreen. The displays can show the same image or different images, as can the large displays. The large displays can also be easily connected to student machines to show their work. Lighting controls are mounted on the wall and at the instructor station.

Our campus interior designer was a key member of the team. She helped with conceptions of the overall environment as well as details such as selection of furnishings, colors and artwork. She also helped to bring the Facilities group into the team.

Thus, the design and implementation team was a truly cross-functional partnership, with a broad range of skills, knowledge and perspectives. The team also had a clear sense of excitement in this effort because we were embarking on a radical, yet integrated approach to classroom design. An associate dean and other faculty were pleased that "...we were involving faculty in the design of classrooms..." As the NLII advises: "Learning, rather than heating systems, lighting controls or computer projectors, should be at the center of learning space design¹⁸." Development of the space from conception to operational classroom took about 7 months—remarkable speed considering our budget.

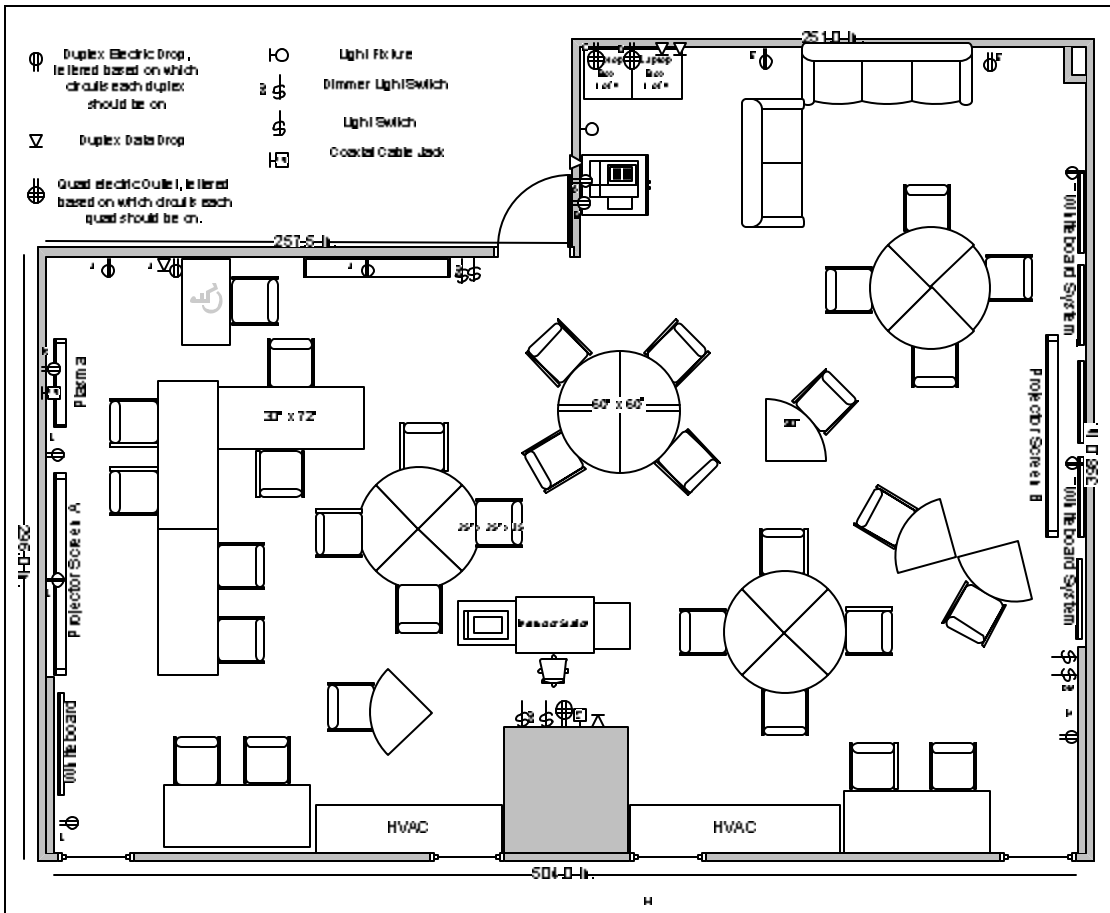


Figure 2: Layout and Dimensions

Components of the Studio

Quantity	Component	Colors
5	Versteel Rectangular Tables	Shoji Screen, Black, Brite White
1	ADA Versteel Table	Shoji Screen, Black, Brite White
20	Quarter Round Versteel Tables	Shoji Screen, Black, Brite White
6	Couch sectional chairs	Nolita
8	Steelcase Crush Cans	Lacquer, Black, Nutmeg, Taupe, Raven
31	Steelcase Cachet Chairs	Black
1	Design within Reach Bookcase	Red
7	Artwork	various coordinating colors
	Carpet	dark shades of Brown, Orange, Blue, Green
	Walls	Putnam Ivory

1	Spectrum Instructor Podium	medium wood and black
1	Mobile Instructor Podium	Steel
1	Link Component Cabinet	Grey
4	Spectrum Laptop Lockers	Grey
1	50" Plasma TV and monitor	
2	Ceiling Mounted NEC NP1000 data projectors	
1	Handheld Shure Wireless Microphone	
1	Over the ear Shure Wireless Microphone	
2	Dell GX620's Towers	
31	Dell Latitude D630 laptops	
3	Color LCD Crestron Touch Displays	
1	SMART Sympodium touchscreen	
2	Cisco Access Points	
1	Dibos Security Camera Server	
2	Bosch Security Cameras	
1	Topedo Marker Board System	
2	Electric Da-Lite Screens	
10	Ceiling Speakers	
1	Digital Presenter by Samsung	
1	HP 4250 Duplex Printer	

Approximate budget

The following table provides a cost breakdown. Some costs were reduced because the system integrator waived their usual design fees and contributed the Sympodium touchscreen. Color-Art Integrated Interiors provided furniture at "demonstration" prices.

Item	Cost
Construction	\$86,000
AudioVisual	\$45,000
Furniture	\$23,000
Computers	\$52,000

Project Management	\$5,000
Security	\$5,000
Interior Design	\$5,000
Artwork	\$1,000
Total	\$222,000





Figure 3: Elements of the finished studio

Assessment

We call the facility a “Learning Studio,” not only because the term “flexible, innovative technology-enabled classroom” is awkward, but the term “studio” concisely conveys the sense of:

- innovation for the campus,
- a new approach to physical planning,
- an experimental space,
- a prototype from which the campus will learn how to develop other spaces,
- support for new ways to learn and to teach.

These were high expectations of a single classroom renovation. As the component list and Figure 3 show, the physical details adhere to the current¹⁹ idiom for this approach to classroom design, with features that include:

- wireless laptops
- reconfigurable furniture—a selection of easily movable tables and chairs
- diffuse lighting
- furnishings, floor, wall treatments and artwork that create a sense of welcome (refer to the table of components and colors)
- sophisticated lighting and instructor controls
- several large-screen display options and controls
- a panoply of technologies: document camera, Sympodium touchscreen

However, we also needed to discover how these accoutrements would enhance teaching and learning, and thus contemplated an assessment process from the outset. Although many “flexible” classroom projects have been described favorably in print and on the Internet, many of the descriptions contain assertions of effectiveness rather than presentations of evidence. We wanted to gather qualitative and quantitative data to begin to show that these kinds of investments could pay off in outcomes important to the institution.

For Spring Semester 2007, 9 instructors taught 16 sections using the Learning Studio, with a total enrollment of 203 students. The average class size was therefore about 13. With these numbers and at this exploratory stage, qualitative measures and qualitative data are the most appropriate way to capture evidence. We are seeking to evoke and then to portray changes in teaching approaches and changes in how students and teachers “feel” about the classroom. Although we do include a survey, quantitative measures will need further development and longer term studies.

We realized that the space would be used for many different styles and kinds of teaching and learning, so we used several methods to gather data from as many perspectives as possible:

1) Faculty observations.

We asked faculty to observe their students’ behavior and their own in the Studio. They would try to identify how behavior differed from what they saw in traditional settings, and record their observations to share with us.

2) Blogs

We asked faculty and students to participate in blogs about the Studio. One blog was established for the teachers, and one for students in each of the classes. We informed participants explicitly that blog entries would be read and analyzed in order to assess the effect of the Studio on them, so asked that they record not only their impressions of the space, but also reflections on how the space affected their teaching and learning.

3) Video Observations

A faculty member²⁰ in one of the English classes asked students to allow themselves to be video recorded as they took part in a collaborative project assignment. To enable comparison, that same teacher then video recorded students in a different classroom taking part in the same collaborative project assignment. In both cases, a digital video camera was set up in each classroom and was allowed to run through the course of the class meeting.

4) Surveys

ITS conducts regular surveys of students' use of labs and classrooms. One particular survey was directed at students in classes that used the Studio.

5) Summary meeting of the faculty

We planned summary or “debriefing” meetings²¹ at the end of each semester with the faculty users of the Studio. The meeting at the end of the first (Spring) semester was attended by all 9 of the faculty who had taught in the room. The discussion was open and video recorded²² for later review by people who could not attend. The authors reviewed the video systematically to gather the comments and synthesize the themes described in the Outcomes below.

Outcomes

An early measure of the excitement generated by the Studio was the number of faculty who wanted to use it. We announced availability of the classroom late in Fall Semester 2006 for classes starting in January 2007 (Spring Semester). Yet the facility was about 75% booked by the start of the semester. Faculty included instructors from the Center for Languages and Cultures, English, Mathematics and Computer Science, Education and Business. The demand continued for non-regularly scheduled usage.

We derived the qualitative results from survey comments as well as the assessment blog²³ [SSBLOG] and the debriefing meeting [SUMVID]. The 15 student and 8 faculty/staff participants in the blog generated 37 entries. The debriefing meeting had 19 faculty and staff participants and lasted almost 2 hours.

The themes that emerged are consistent and exciting confirmations of general descriptions of experience at other institutions. The Learning Studio seemed to cause a marked change in student attitude, encouraging students to be more positive and more ready to be engaged. Students clearly found the environment conducive to learning, judging from the students' own assessments.

A number of the faculty users came from the Center for Languages and Cultures and taught courses such as Japanese and Spanish in the Studio. Instruction in the Studio also happened to coincide with curricular reform and pedagogical change in the foreign language programs. Faculty in department unanimously agree that changes in pedagogy were enabled, facilitated and informed by the use of the Studio. The Studio also made it easier to use and share authentic materials from the Internet and other sources. Efforts to make language classes more interactive and improve the oral proficiency of students would have been much more difficult and less culturally rich without the technology and classroom design of the Learning Studio.

Survey results

Along with our regular surveys of students' use of technology-enhanced classrooms, we directed a specific survey to students who took classes in the Studio. The results are very positive, but should also be considered preliminary, since we only have one semester of data and 18 respondents out of a possible population of 203.

Question	Response
In your opinion, could this course be taught without student workstations?	72% No; 22% Yes; 6% n/a
Could this course be taught in a traditional classroom without technology?	78% No; 22% Yes
In your opinion, did the use of the technology in this room enhance your learning experience for this class	100% Yes
How would you rate the overall classroom support?	89% Very Good; 11% Good
How would you rate the overall Technology Enhanced Classroom experience?	100% Very Good

The Space is the Message

Students and faculty comments repeatedly evoked the title of this paper. Many of the student blog entries [SSBLOG] directly echoed the sentiments expressed in this paper's opening quote. A faculty member [SUMVID] said that the institution conveys an "...unspoken message when the institution invests this much time, money and effort to create this room..." Other instructors [SUMVID] were "honored" and "grateful" to be in the room and felt a "sense of responsibility to use the room well." The instructors who had used the Studio expressed general consensus [SUMVID] that students were in awe of the fact that the university made this investment and students had the sense of the Studio as a "special place." Students appeared more alert, and did not slump in their seats as they might in a regular classroom [SUMVID]. A student [SSBLOG] commented that "...I would definitely feel like I was at a top level university if all my classrooms offered these amenities."

These sentiments were also expressed in actions. Faculty cooperated informally to schedule this limited resource, using the Studio only "when necessary" to their lesson plans so that other faculty might have the opportunity to use the space. In this case, scarcity has created cooperation rather than competition. Students feel that it's a "privilege" to have a class in the Studio, and openly admit it. Indeed, they feel "embarrassed" if they don't pay attention in the room.

These results confirm the NLII statement that "...[l]earning spaces convey an image of the institution's philosophy about teaching and learning....Space can either enable—or inhibit—different styles of teaching as well as learning²⁴."

Unfortunately, this “... refreshing change to be in a bright cheery space with carpeting and flexible seating [SSBLOG, student] ...” also highlighted the “...need to improve the dismal physical condition of many of our regular classrooms [SSBLOG, faculty]...” This contrast will be an issue our campus will need to address, since the unintended consequence may be “haves” and “have-nots” in terms of access to good learning spaces.

Use of Technology and Support Requirements

The combination of laptops and flexible display inputs created possibilities for the use of rich media by students and faculty, including video and audio. Because we made it easy to attach laptops to any of the large displays, student-led presentations are quicker and easier to set up. Thus we have a student saying: “...I personally love to have an individual laptop that can be connected to the big screen...” [SSBLOG]. In other classes or meetings, this easy connection to the displays enabled participants, without much prior planning, to take live notes or minutes that were viewable by everyone.

The novelty of the Studio and the array of technologies did require some special handling of training and support. We anticipated some of those needs – instructors were invited and encouraged to attend orientation/training sessions prior and during the semester. Classroom support staff also assisted faculty with questions during classes if they were contacted via phone. Support staff met with instructors prior to the start of each course to see if laptops were being used during each class and to see if they had any other questions. Staff also met with the instructors at the end of each course. Classroom support staff spent approximately 2 hours more a week supporting the Learning Studio compared to the “usual” technology classrooms. Faculty required more support at the beginning of the semester learning the features and control system in the room. Towards the end of the semester, faculty continued to have questions regarding features in the room they hadn’t used at the beginning and wanted to try to learn for future semesters.

One class was from the College of Education, and the instructor felt that the use of the Studio increased future teachers’ awareness of the possibilities of the technology and would help them better integrate technology into their curriculum [SUMVID].

The Studio converted at least one student [SSBLOG] to the use of laptops: “...I’m not the biggest fan of the laptops but I do have to say that they were very useful for the interaction during class because you had to follow along where the professor led...”

Engagement

Students also commented on the comfortable setting that the Learning Studio provides; one asked [SSBLOG] “...why does everything have to be uncomfortable in a school setting?” An instructor found that because they were comfortable [SUMVID], students were better able to respond to the challenge of providing input. When the environment is more relaxing, it’s less threatening and students appear more willing to take risks. Faculty observed that although other classrooms might have movable furniture (tables and chairs), those spaces don’t have the same feel.

The Studio has no obvious “back of the class,” as the photographs show [SUMVID]. This seems to be true figuratively as well—the students have “no place to hide” and thus have no choice but to engage. An instructor remarked on the change in students’ demeanor, indicating more active engagement in the class [SUMVID]. An even more basic indicator is from the student who said [SSBLOG]: “...I have never seen students go to sleep like I have in other classrooms...” The same comment was echoed by an instructor [SUMVID].

The video recordings show the engagement plainly [KVID]. Students in the Studio interacted with each other more frequently and at greater intervals, and became more involved in their collaborations than did their counterparts in the non-Studio classroom. Students in the non-Studio classroom spent more time typing on their computers and less time interacting with their group members. When they did interact, it was only for brief consultations.

Student and faculty learning

Students felt that [SSBLOG] “more rooms like this....would be a fantastic addition to the learning experience..!” and also “...this whole classroom seems to be an attempt to just make learning easier...”

Faculty observed that the Learning Studio challenged, inspired and empowered students, causing them to take greater ownership for their learning. By fostering individual initiative, the Studio seemed to increase students’ level of creativity [SUMVID].

In a Spanish class, the instructor found that the facilities (including the technology) empowered students “to communicate in Spanish.” The greater interaction between students increased “rehearsal of the language,” an obvious way to solidify learning of a foreign language [SUMVID].

The room encourages instructors to “give up the podium,” because it facilitates, empowers and encourages teachers to “let loose.” One instructor believes that “the person doing the talking is the one doing the learning [SUMVID],” and thus for students to maximize their learning, they must be encouraged to do some of the talking too. She felt that by giving up the podium, she helped create community and opportunity for the students. As Mitchell²⁵ writes: “New types of learning spaces...create new patterns of social and intellectual interaction.”

An instructor found that the facilities and technology in the Studio allow curriculum change to happen more easily and made her think about doing things that were not possible otherwise. She felt that the room “...makes me ‘re-invent’ myself as a teacher because it’s easier to redesign the role of the teacher...I wouldn’t have thought of [those changes]...had I not been this room....[The space] allows me to circulate among the students more easily...” Thus the Studio allows many different ways of interacting with students, including enabling hands-on assistance and modeling learning activities [SUMVID].

A student felt that presence of technology forced the instructor to “...learn how to use it all...”[SSBLOG], apparently changing their pedagogy in the process. Thus, the Studio enabled teacher learning as well as student learning, a positive outcome if the institution is to become a “learning organization.”

Adult spaces and collaboration

The flexibility of the Studio furniture and the presence of comfortable chairs allowed the creation of social spaces that led to collaboration and interactivity. The instructor of an evening class found that the space was especially suited to the more mature ages of his particular group of students [SUMVID]. The Studio’s “adult-sized” seating²⁶ encouraged students to think about themselves as adults. Another instructor commented [SSBLOG] “...I am particularly annoyed that a mature graduate student who might work all day in their own office...comes here to sit in a desk/chair designed for high school students.” This directly addresses the relatively high average age of UMSL students.

The evening class instructor also remarked that a normal classroom would have been no better than sitting at home and taking the class over the Internet. In contrast, the Studio promotes small group activities and strikes “...a good balance between high-tech and high-touch...” The technology is sophisticated, but the arrangement of the room appears to encourage more human interaction. Even when students have difficulty with particular aspects of technology, their peers are better able to help [SUMVID].

The Studio worktables include larger rectangular tables in addition to the pie-section “triangular” tables. The combination is configurable as a large boardroom table that accommodates over 15 people. This allows the simulation of a workplace setting and a more “work-like” environment. The implicit message is that the students are “here to do” in addition to being “here to learn,” thus promoting active learning [SUMVID].



Figure 4: Boardroom

Another instructor found that because the tables move so easily, she could decide to reconfigure the space almost at the last minute, and she could be more spontaneous about how she wanted students to interact to achieve the intent of her lesson plan [SUMVID]. This is entirely consistent with the experimental intent of the space. Indeed, one instructor called the Studio an “adult kindergarten,” a dialectical, yet positive way to describe the room as a playful and active learning environment [SUMVID & SSBLOG].

For smaller classes, the variety and size of tables offered more space to spread out students’ material. This makes individual and group work more efficient and creates an environment that is more “normal” than a cramped chair/desk combination [SSBLOG].

Accessibility

A reviewer²⁷ pointed out a consequence unforeseen by the authors – the Studio appears to be much more accessible than other classrooms to people with disabilities and needs for accommodation. We later interviewed an instructor who has difficulty raising her arms to use standard whiteboards but was able to use the Sympodium touchscreen from a seated position to clarify points and annotate classroom notes. The worktables can easily accommodate someone in a wheelchair, the multiple displays can be used to magnify material for vision impaired students and the displays could also accommodate captioning for hearing impaired students. This is also an important avenue for further exploration – the “message” is inclusive.





Figure 5: Accommodation of disabilities

Specific innovations

Several faculty created specific configurations of the room which we considered innovative and surprising.

- a) In a language class, students sit side by side, but face opposite directions so each student looks at opposite screens. The screens have different material and the students then have to interact in Spanish to “fill in the blanks.”



Figure 6: Facing opposite screens

- b) One instructor used 12 different configurations of the room in the course of the Semester. Several are shown in Figures 7 and 8.



Figure 7: A chain of tables



Figure 8: Comfort

- c) In an English class, students used the triangular tables in a new way. These tables are “normally” put together as circular tables so that students can sit facing each other. Instead, the students moved the tables outwards so they could sit in the

center of the circle facing out. This might seem to inhibit collaboration, but these students were using the laptops for writing and research and this configuration actually made it easier for them to turn and talk to each other and to show each other what they were doing on screen.



Figure 9: Outward facing tables

- d) In another language class, the space was open enough so that the tables could be arranged to provide a single desk per student and yet have enough open space between students such that oral assessment using the laptops was possible and the students had sufficient work space.

Lessons Learned

We have learned many lessons in the design, creation and use of the Studio, and our learning continues as other faculty use the facility. Some lessons are subtle while others are obvious in hindsight; we highlight and thematically organize a few here:

Change Management

- 1) The evidence is clear that the Studio is an important enabler of change. As more rooms are converted, faculty across the institution will need to pay deliberate attention to curricular and pedagogical change. For one thing, student expectations will rise.

- 2) Flexible space has meant that the Studio seats fewer students than a “regular” classroom of the same size. This tradeoff between learning needs and space has been mentioned by others²⁸, and induces an institutional debate about the goals of effective learning versus efficiency in use of facilities.
- 3) The Studio is a good way to show off what the campus can do. Visitors are very impressed, and even people walking by the room during a class will peek in to see what is happening.

Support

- 4) The Studio deliberately concentrates many current technologies and some are unfamiliar to faculty. Our labs and classrooms support team was diligent in providing assistance when needed, starting with several orientation sessions at the very beginning and continuing through the semester. We are not sure that this level of support is sustainable, but do expect that as more faculty become familiar with the Studio, that the demands will taper down. On the other hand, faculty will need support as they think of new ways to use the facilities and changes to their curriculum.
- 5) Our classroom scheduling process is quite rigid and the current system does not provide for much texture in the attributes of each classroom. For instance, an instructor cannot specify that for the Tuesday session of the class, she needs technology X, but on the Thursday session, she only needs a seminar room. This rigidity has hampered the effective scheduling even of the current stock of classrooms. The existence of the Studio highlights the need for more flexibility, since it is a very limited resource.
- 6) A good collaboration with a technology integrator is essential. Although our campus staff was familiar with most of the individual technologies, the Studio required another level of integration. We had the benefit of a local firm that we knew from previous work.

Mechanics

- 7) Pie-section or triangular tables on wheels tip easily! We’re still working with the furniture supplier on different combinations of weighted legs.
- 8) The room is just large enough to require some augmentation with a PA system, but too small to justify extensive use of fixed microphones. Fixed microphones would also decrease the flexibility of the seating arrangements. The HVAC system is also loud enough that most speakers require a microphone. We installed wireless microphone capability, but students found that passing the handheld microphones around was awkward. Faculty found the over-the-ear microphones cumbersome.

- 9) The Studio appears ideal for video recordings so that students may later review the class. Recordings would also be useful to continue research on the use of the room itself, and we have already used the room for such purposes. However, the current mechanisms for video capture are cumbersome and need to be streamlined.

Reflections on Success

We think that the Studio has clearly succeeded in stimulating change, especially pedagogical change. The term “Studio” continues to be appropriate; it’s a place to try new expressions of the principles of teaching and learning and to change the “institutional context²⁹.”

The Studio is also a significant investment, and so another set of goals has to clearly relate to learning outcomes: engagement, attitude and collaboration in addition to absorption of curriculum. Measures of those outcomes are necessarily qualitative at this point, but based on the comments from students and faculty who actually learned and taught in the space, we would cautiously say that the Studio has succeeded in those goals. Of course, we will need to continue to evaluate progress in outcomes as people gain experience with using the space.

UMSL is preparing for re-accreditation later in 2008. An important theme from the Higher Learning Commission is “continuous improvement” and linking everything that the university does to student learning and outcomes. The Studio provides one way to link physical facilities development with student learning.

We can also contemplate quantitative measures of success such as differences in grade points, especially through comparison between classes held in the Studio versus those held in “regular” classrooms. We would say that it’s too early to tell, given only a few semesters of classes. Such quantitative measures are also notoriously difficult to attribute to factors such as classroom environment, but we are very aware of the need to devise ways to do so.

We did have one comparison³⁰ that was at least theoretically possible—the same course, taught by the same instructor, but one section was taught in the Studio and the other in a regular classroom. There was no difference in the grade achievements. On the other hand, the “experiment” was not strictly controlled since the student composition of each section was different. The section in the regular classroom was held in the evening, and its students were older and more mature. The instructor did notice that students in the Studio made friends more easily and were much more animated in their interactions while doing group research on the Internet. Even in this case, there were too many other variables in the two populations to attribute grade differences solely to the room.

Other quantitative measures include increases in enrollment, increased retention of students who take classes in the Learning Studio, increased ability to recruit, etc. These

measures will take time to gather and to link causally to the Learning Studio. UMSL calculates and publishes these measures at the campus level of course, but it's difficult to relate these aggregated measures to a single classroom.

Open Questions and Next Steps

We have the vexing question of whether the results thus far are due to the novelty of the Studio—yet another manifestation of the “Hawthorne effect³¹.” The institution has built this new space, the instructors are excited, the space and equipment are beautiful and people are paying attention, but what happens when the novelty wears off? What happens when all classrooms are built this way? Although that would be a pleasant problem to have, will the effects be sustained?

A related question from an instructor was whether “being comfortable just meant an excuse for sloppiness,” which she raised only partly tongue-in-cheek [SUMVID]. The question anticipates potential criticisms that these new spaces merely coddle students, and is both a question about long-term outcomes as well as about public relations.

The Studio brings together many new components in support of its overall goals—from paint to laptops. Because of the expense of the total package, we may need to analyze the package and try to prioritize the importance of the major components. In that way, we may be able to gain some large part of the advantages of the Studio by implementing some portion of the package. On the other hand, it may very well be that the synergy created by the whole collection argues against that kind of deconstruction

Even as we try to answer these questions, the Studio has inspired more modest efforts to create some flexibility in current classrooms. In response to a request from the Chemistry department to support a flexible approach to lab instruction through the use of laptops, we designed and assembled a mobile laptop cart modeled on the larger version created for the Studio. Thus, we are at least beginning to address the divide between “haves” and “have-nots.”

We have already used what we learned to create another Learning Studio in a different building. Because of the enthusiasm demonstrated by the language instructors, ITS worked with the Center for Languages and Cultures (within the department of Anthropology and Languages) to create a new space in the former language lab. A Memorandum of Understanding specifies that the use of the space will be shared with other departments so that even more faculty will have opportunities to use a Studio. The second Studio was put into use in January 2008. We have also begun working with several Deans who would like Studio-like spaces in their section of campus. We continue with our collaborative efforts to negotiate where and how those spaces will be developed.

We continue to build awareness and support for the Studio on campus and off, with the goal of obtaining funding to create more such spaces. This assumes of course, that these spaces do result in better student outcomes. Our Chancellor was an early visitor, and

suggested a subsequent visit by the Board of Curators. They and other visitors were impressed.

We are also working with the Advancement Office on fund-raising opportunities. While the Studio was expensive relative to the ITS budget, it's also much less expensive than an entire building. A Studio presents a focused and defined opportunity for a donor; that we can show at least preliminary effects on student outcomes should also be attractive. The result is tangible and could be a naming opportunity for a donor who desires that recognition.

We have given talks³² at regional conferences on teaching and learning. Other colleges in the area have expressed interest and we have given tours to them. Through these efforts, we are expanding the number of people in the region who are interested in this new approach to teaching and learning spaces. This may even lead to a local Community of Practice.

Summary and Acknowledgements

We shall continue to assess and to learn—we think there's a real need for solid evidence to support effects on student learning. We hope to engage graduate students (and their advisors) who should be interested in further research in this area. This paper only captures our first experiences, and we will continue to track the interplay between space, technology and the enhancement of teaching and learning.

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Endnotes

¹ see survey in Caruso, J.B. and G. Salaway, "The ECAR Study of Undergraduate Students and Information Technology, 2007." ECAR Sept 2007.

² See for example, Educause Review, July/August 2005 issue.

³ We pay homage to Marshall McLuhan, who coined the phrase "the medium is the message," in *Understanding Media: The Extensions of Man*. New York: McGraw Hill, 1964.

⁴ SSB449 blog, Spring and Summer 2007. We will use [SSBLOG] to refer to this data source in subsequent text, a convention used in qualitative research.

⁵ Project Kaleidoscope, "What Difference do Improved Facilities Make?" Report of the Committee of Visitors, 1998., retrieved August 20, 2007, www.pkal.org/documents/CommitteeOfVisitorsReport.cfm

⁶ Diana Oblinger, "[Boomers, Gen-Xers and Millennials: Understanding the New Students](#)," *EDUCAUSE Review*, Vol 38, No. 4, July/August 2003, pp. 37-47.

⁷ UMSL Action Plan, http://www.umsl.edu/chancellor/assets/pdfs/ActionPlan5_1_07.pdf

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- ⁸ “Project Kaleidoscope”. Op. cit.
- ⁹ Klein, W and Keel, R., “Report on Provost’s Forum on Innovative Classroom Design,” August 8, 2006, internal report of the University Assembly Committee on Information Technology Subcommittee on Instruction, University of Missouri - St. Louis.
- ¹⁰ See for example, “Project Kaleidoscope,” op. cit.
- ¹¹ Kawasaki, Guy. “The Art of Innovation,” January 10, 2006, http://blog.guykawasaki.com/2006/01/the_art_of_inno.html, retrieved August 20, 2007.
- ¹² Klein and Keel, op. cit.
- ¹³ Johnson, Chris and Cyprien Lomas. (2005). Design of the learning space: Learning and design principles. *Educause 40*(4), 16-28.
- ¹⁴ Chism, Nancy Van Note and Deborah J. Bickford. (2002). *The importance of physical space in creating supportive learning environments*. San Francisco: Jossey-Bass.
- ¹⁵ Cornell, Paul. (2002). The impact of changes in teaching and learning on furniture and the learning environment. In N. V. N. Chism and D. J. Bickford *The importance of physical space in creating supportive learning environments* (pp. 33-42). San Francisco: Jossey-Bass.
- ¹⁶ Johnson and Lomas, op. cit.
- ¹⁷ Schiller’s Audio-Visual, a St. Louis firm specializing in design and supply of audio-visual systems
- ¹⁸ NLII white paper, “Leading the Transition from Classrooms to Learning Spaces,” October 2004.
- ¹⁹ For a recent example, see “High Tech Learning Spaces,” *Campus Technology*, August 2007, pp 39-40
- ²⁰ William Klein, videotape of Spring 2007 English at University of Missouri - St. Louis. Henceforth referenced as [KVID].
- ²¹ William Klein, notes for SSB449 debriefing session, May 2007.
- ²² UMSL Debriefing meeting, May 2007. Video streams available at: mms://winmedia.umsli.edu/umsliitv/SSB449Event-Part_1.wmv and mms://winmedia.umsli.edu/umsliitv/SSB449Event-Part_2.wmv. Henceforth referenced as [SUMVID].
- ²³ As mentioned previously, we use the notation [YYY] to refer to sources of qualitative statements, summaries or quotes to avoid excessive footnoting. This is a convention used in qualitative research. Thus, [SSBLOG] refers to the assessment blog, [SUMVID] refers to the debriefing meeting and [KVID] refers to the video recording of Klein’s class.
- ²⁴ NLII white paper, op. cit.
- ²⁵ William J. Mitchell, “Rethinking Campus and Classroom Design,” presentation at the NLII 2004 Fall Focus Session, Sept 9, 2004, Cambridge, Mass. <http://www.educause.edu/librarydetailpage/666&id=nl0438A>, retrieved August 20, 2007.
- ²⁶ In many classrooms at UMSL, the seating consists of chairs with a small attached writing platform adequate for a notebook. These are space-efficient and even movable, but awkward and tight for many adults.
- ²⁷ Allison R. Tom, University of British Columbia, personal communication.
- ²⁸ Johnson and Lomas, op cit.
- ²⁹ Johnson and Lomas, op cit.
- ³⁰ William Klein, Spring Semester 2007 English, University of Missouri - St. Louis.
- ³¹ See for example: http://sociologyindex.com/hawthorne_effect.htm, retrieved September 10, 2007.
- ³² Kenneth Voss and Christopher Scheetz, “Innovative Classroom Design,” MOREnet Helix 2007 conference.