Active Learning Classrooms Pilot Evaluation:
Fall 2007 Findings and Recommendations

Prepared By The ALC Pilot Evaluation Team

UNIVERSITY OF MINNESOTA
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This document provides a summary of the fall 2007 exploratory research on the Active Learning Classrooms constructed as a pilot project by the Office of Classroom Management (OCM). This pilot project involves a renovation of two general-purpose classrooms. These rooms were University of Minnesota design modifications modeled after North Carolina State University's Student-Centered Activities for Large Enrollment Undergraduate Programs (SCALE-UP) project and Massachusetts Institute of Technology's (MIT) Technology Enabled Active Learning (TEAL) project.

The goal for these new learning spaces was to create a student-centered, integrated, and active learning space using flexible design and innovative construction techniques. These pilot learning spaces provide new and innovative classrooms, demonstrate new flexible classroom construction techniques, and allow faculty and students to experience and assess new classroom designs and pedagogy.

About the Active Learning Classrooms

The two Active Learning Classrooms (ALCs) include the Biological Sciences Center Room 64 on the St. Paul campus, which seats 117 students, and the Electrical Engineering/Computer Science Building Room 2-260 on the East Bank, which seats 45 students. These ALCs feature large round tables that seat nine students each. They provide switchable laptop-based technology, multiple fixed flat-panel display/projection systems, and an instructor station that allows selection and display of specific information. These rooms also feature a 360-degree glass markerboard around the circumference of the classroom.

Biological Sciences Center, Room 64

Electrical Engineering/Computer Science Building, Room 2-260

Both classrooms feature reconfigurable low-profile flooring with internal power and cable management and demountable wall systems. The Biological Sciences Center Room 64 demountable wall systems allow the room to be reconfigured, or flexed, on an annual basis to meet changing room size or pedagogical requirements. The 117-capacity room has the ability to flex smaller into two Active Learning Classrooms (72 and 36 capacity), two traditional seating table/chair classrooms, or one Active Learning Classroom and one traditional classroom.

The Active Learning Classroom is built upon the technology foundation of the University of Minnesota Projection Capable Classroom (PCC) standard. This classroom technology standard was implemented in

2000 by OCM in close coordination and collaboration with the University of Minnesota Twin Cities campus community and applies to all general purpose (or central) classrooms. As a fundamental part of its design, the PCC-based Active Learning Classroom is predicated upon student-provided laptops or computing devices. The ALC design looks forward to the time when "person-based" mobile computing overtakes room-based installed computing infrastructure in many classroom situations. The ALC classroom design is predicated on the assumption that in the future there will be an institution-wide personal computing solution, and that student personal computing devices will become as ubiquitous as are cell phones today.

ALC Partnership and Project Evaluation Team

The OCM partnered with the Digital Media Center (DMC), Office of Information Technology (OIT) and formed the Active Learning Classroom Pilot Evaluation Team. This team determines the ALC faculty development services as well as the critically important assessment and evaluation plan for these rooms. As indicated in the table below, the ALC partnership provides a number of scheduling services to instructors using the ALCs.

To schedule a(n)...	Contact....
Course in one of the ALCs	Nancy Peterson, the Office of Classroom Management (OCM) Scheduling Manager, at (612) 625-6089 or at n-pete@umn.edu
Tour of one of the ALCs	John Knowles, the OCM Instructional Technology Coordinator, at (612) 626-8650 or at knowl014@umn.edu
ALC teaching and learning consultation	The Digital Media Center at (612) 625-5055 or at dmc@umn.edu

The ALC Pilot Evaluation Team continually conducts research to learn about instructor and student attitudes and expectations regarding teaching and learning in these new spaces, as well as, how the spaces are utilized vis-à-vis the teaching strategies employed and the technologies and room features used. In addition, OIT partnered with individual departments and faculty members teaching in the ALC rooms to provide laptops/person-based computing devices for some students in courses in ALC rooms.

Fall 2007 Pilot Evaluation

The scope of the fall 2007 research involved distributing survey questionnaires on the four courses taught in the ALCs, as well as, conducting more in-depth research on two courses. The response rate for the student questionnaire was 27.1 percent (n=51) and the response rate for the instructor questionnaire was 100 percent (n=4). The more in-depth research for these courses included instructor interviews at the beginning of the semester (n=3), instructor interviews at the end of the semester (n=2), and classroom observations (n=13). This evaluation does not focus on the technical performance of the flexible construction materials or techniques in the rooms. Overall, the data suggest that the Active Learning Classrooms were very well received by both the instructors and students. The ALC Pilot Evaluation determined four sets of research questions. The key findings and recommendations for each of the four sets of questions are listed on the following pages.

Question 1: Instructor Attitudes and Expectations

What are faculty attitudes and expectations for the new learning spaces as they start the semester? Do their attitudes and expectations change over the term, and are they fulfilled?

Each one of the four instructors in the Active Learning Classroom held high expectations and extremely positive attitudes about this learning space before, during, and after the semester.

The *key findings* through questionnaire data, interviews, and class observations are as follows:

- Instructors noted that the ALCs changed the classroom experience in a way that was over and above their expectations. They found:
    - the overall relationship they had with their students deepened; they felt closer to their students
    - their role changed in the ALCs; one instructor noted that role shifted to that of a "learning coach" or a facilitator
    - each of the instructors felt that the experience in the ALCs changed the relationship students have with each other, which was a benefit for collaborative projects
    - that teaching in the ALC is a different experience and may cause some other faculty to step outside of their comfort zones and/or may require some major changes in instructional strategies.
- Some instructors mentioned having difficulties with the user interface on the instructor station.
- Some instructors expected person-based computing devices to come with the ALCs, even though they are not supplied with any other general purpose classrooms.
- Instructors grew quite attached to the ALC teaching experience, and express strong desire to keep teaching in the ALCs in the future.
- Overall, instructors had positive attitudes, even with their high expectations.

> "I loved it. I can't imagine teaching in a different place.
>
> It was just special - a wonderful class - a wonderful experience."

Based on the key findings from this preliminary data, the ALC Pilot Evaluation Team suggested the following *recommendations* for the future:

- Provide instructors with clear and direct communication that person-based computing devices are not included in the ALCs, just as they are not included in any other general purpose classroom.

- Conduct usability testing to address the user interface difficulties.

- Provide a mandatory and more comprehensive instructor orientation to the ALCs, including an in-class, short workshop and support on the first day of class.

Question 2: Student Perceptions

How do students perceive the new spaces? Are they comfortable in the new arrangements? How do the new spaces affect their relations with their classmates? With their instructors?

Students had very positive reactions to the ALCs. The ***key findings*** from questionnaire data are as follows:

- Students found the ALCs were effective for teamwork and collaborative projects.

- Ninety-eight percent of the students surveyed found the ALCs to be student oriented.

- Students also found the ALCs:
    - helped them feel more connected to their instructor and, especially, to their classmates
    - encouraged discussion and helped them feel active and talkative.

- Students reported feeling comfortable in the ALCs.

- A few graduate-level students reported difficulty with the user interface on the instructor panel when they gave a class presentation.

- Glass markerboards received statistically favorable responses from students, yet the individual student responses were mixed. Students found the markerboards helped them collaborate with their teams, but two students and one instructor suggested that the reflection from the glass markerboards was problematic.

- Overall, students had overwhelmingly favorable perceptions of the ALCs.

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"When we're working on a group project, we were able to look up information and display it on the screen above the table...This also allowed us all to remain engaged..."

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Based on the key findings from this preliminary data, the ALC Pilot Evaluation Team suggested the following ***recommendations*** for the future:

- Provide a mandatory student orientation to the ALCs consisting of a short hands-on orientation on the first day of class, especially in graduate-level courses where the students will more likely be presenting and leading class discussion.

- Conduct a student focus group to learn more about targeted items in the ALC experience, e.g., the glass markerboards and person-based computing devices.

Question 3: Learning Technologies

How are the technologies used, both from faculty and student perspectives? What teaching/learning strategies were used, and how did the rooms facilitate or inhibit those strategies?

There were a number of different teaching and learning strategies used in ALCs across disciplines. The table on the following page describes a few examples that came from the 13 classroom observations conducted in the Active Learning Classrooms.

Discipline	Instructional Strategy Employed
Aerospace engineering	Provided software demo of a drawing tool for 3D objects using the two projection screens
Biology	Used the glass markerboard to build a gene by sequencing RNA and proteins
Computer science	Allowed graduate students to lead class discussion on intelligent agents from the instructor station
History of medicine	Encouraged students to tell a historical story using electronic archival documents
Mechanical engineering	Used the document camera to demo a DC motor and allow the class to work in teams to determine the torque and torque curve

The *key findings* through questionnaire data, interviews, and class observations are as follows:

- Instructors found:
    - the ALC is set up for collaboration, which doesn't require the preparation time that many other rooms require, and it creates the environment where learning could easily occur
    - the round tables were key to the experience in the ALC
    - themselves using the document camera more than they expected.
- Instructors found the round tables, document camera, glass markerboards, and student display screens to be the most important features of the ALCs.
- One instructor noted, "The round tables—the fact that they are looking at each other instantly changes their relationship with each other. That's the main thing the room does; it changes the relationship that faculty have with students and the relationship that students have with one another."
- Although the majority of students admitted to owning laptops, only half of the students surveyed would be willing to bring them to class.
- The instructors and students found the student display screens to be helpful for teamwork. There were several unsolicited comments that spoke to the tremendous potential the ALC has for collaborative projects and team-based activities.

> "The main thing the room does - it changes the relationship that faculty have with students and the relationship that students have with one another."

Based on the key findings from this preliminary data, the ALC Pilot Evaluation Team suggested the following *recommendations* for the future:

- Conduct a student focus group to learn more about targeted items in the ALC experience, e.g., the glass markerboards and person-based computing devices.
- Inform the instructors about the various faculty support units at the University of Minnesota that can help them learn how to integrate technology-enhanced instructional strategies in the ALCs.

Question 4: Physical Features

In what ways did the physical features, such as seating, sightlines, lighting, ventilation, acoustics, and power affect teaching and learning? Were any adjustments made by faculty in their teaching approach specifically in light of room design/function? If so, what was learned? If not, would they be willing to make adjustments of various sorts?

The quantitative data in the student questionnaire about the physical features of the Active Learning Classrooms were very positive overall (well above average). The instructors and students in these rooms offered a number of comments, suggestions, and recommendations to help improve these learning spaces in the future, such as the glass markerboards, the instructor station, and round tables. The *key findings* through questionnaire data, interviews, and class observations are as follows:

- More than 85 percent of students surveyed recommend this space for their other classes.
- Two instructors commented on the need for more space for students' personal items.
- Instructors and students:
  - expressed a strong like of the ALCs
  - offered many comments to make improvements for future ALCs. Some examples include improving the user interface for the instructor station and room temperature.
- Overall, the students responded favorably to the cleanliness, acoustics, lighting, space, comfort, and the physical attributes of the ALCs.

Based on the key findings from this preliminary data, the ALC Pilot Evaluation Team suggested the following *recommendations* for the future:

- Consider space issues for coats and other personal items when the tables are at full capacity.
- Continue to promote a campus-wide awareness of the ALCs to the faculty as well as key administrators and support staff members.

Overall Response to the ALCs

Overall, these Active Learning Classrooms yielded very positive responses from instructors and students.

The instructors who were interviewed enjoyed teaching in the rooms so much that their only concern was a fear of not being able to continue to teach in these new learning spaces. Similarly, more than 85 percent of students recommended the Active Learning Classrooms for other classes.

Instructors and students overwhelmingly found that this space made a difference for them.

"I love this space! It makes me feel appreciated as a student, and I feel intellectually invigorated when I work and learn in it."