WHAT DO WE WANT OUR LEARNERS TO BECOME?

- Fearless, confident, independent learners who don’t shy away from intellectual challenges.
- Effective collaborators who embrace teamwork.
- Sophisticated, discriminating users of information and technology.
- Creative problem solvers.
- Generous teachers who share their knowledge, experiences, and perspectives with others.
- Good moms and dads, good citizens, politicians, bankers, voters, doctors, etc., who have a real understanding of science and scientists.

WHAT EXPERIENCES MAKE THAT BECOMING HAPPEN?

- Projects that require authentic application of disciplinary knowledge.
- Projects that require students to collaborate, to choose issues that matter to them personally, and to find creative solutions to solve the problem.
- Grading strategies measure standards-based performance rather than identifying a bell-shaped curve of relative performance.
- Classroom activities that require and reward critical discussion.
- A collegial, respectful relationship between students and faculty.
HOW DO WE KNOW?

Controlled studies have shown that new learning spaces:

- Improve students’ engagement in the learning process.
- Help students to outperform final grade expectations, resulting in enhanced learning outcomes.
- Affect teaching-learning activities, even when the instructor attempts to hold these activities constant.
- Are most conducive to student achievement when instructors blend lecture with active, student-centered teaching methods.
- Are perceived in a largely positive light by a broad cross-section of students and instructors.
- Require some adjustment to different lines of sight and focal points.

WHAT SPACES ENABLE THOSE EXPERIENCES?

- Spaces built on the principles of flexible, reconfigurable design.
- Learning environments incorporating technology that permits display of student work to small groups or to the whole class.
- New spatial configurations that reorient the relationships between students and instructor, and among students themselves.
- Spaces that encourage students to take ownership of their learning, and that are available for informal student use.
During each class period at the University of Minnesota today, our Active Learning Classrooms (ALCs) can accommodate 1179 students, who are learning subjects from biology to chemistry, environmental sciences and calculus, in team-based, technology-enriched learning environments. Within a year of opening our ALC-focused building (2010), half of all undergraduates at the University of Minnesota had taken at least one class in an ALC. A freshman entering the University today is likely to have multiple classes in these spaces.

ALCs are student-centered spaces that support innovative active learning strategies, allowing instructors and students to develop more effective teaching and learning strategies, including cooperative problem-solving, computer simulations, discussion, interactive drama, peer review, interactive lectures, and physical models. The ALCs are available for group and individual work before and after scheduled class time. Reflecting student preferences, the ALCs have quickly become one of the most sought after and heavily used student study spaces on campus, as well as for national conferences, workshops, and seminars.

How did these spaces evolve and emerge to become a significant mark of distinction of how learning happens at the University of Minnesota?

**Background: The ALC Pilot**

Our commitment to ALCs began in 2006 when the Office of Classroom Management explored ways to build flexible classrooms that would enable learner-centered teaching approaches. We were inspired by the impact of North Carolina’s SCALE-UP program and MIT’s Technology Enabled Active Learning (TEAL) classrooms on student learning.

Our plan was to test the viability of new construction technologies and with evidence of that viability to gain approval by university building code officials. Most importantly, we wanted to give faculty a place to experiment with teaching strategies that would be enabled in an active learning classroom.

We began with remodeling spaces in the basement of a classroom building into two pilot ALCs. By fall 2007, we had remodeled one 35-person fixed-bench classroom to produce a 45-person ALC (EE/CSci 2-260). We had also merged two existing general classrooms and a computer lab into a space that became a 117-person ALC (BioSci 64). Funding came from combining funds from budgets for planned life cycle replacement, technology upgrading, and other funds. The ALC pilots were intended to stimulate interest in innovative classroom design, demonstrate flexible classroom construction techniques, and allow assessment of learning outcomes.

The ALCs feature large, round tables that seat nine students each in teams of three. Three switchable laptop connections at the table allow students to select which laptop displays on the adjacent 50-inch wall-mounted LCD. At the podium, the instructor can control any table display for projection on the room’s large dual display screens. He or she can also select a specific display on the large projection and student screens from an instructor station.

These rooms feature a 360-degree glass marker board around the circumference of the classroom. Both ALCs are covered by the University of Minnesota’s campus-wide wireless network.

These two pilot classrooms stimulated lively discussion on campus regarding student-centered learning versus lecture-style teaching. Some faculty members were strongly in favor of retaining large lecture halls and did not embrace the changes that ALCs represent. But initial research in the first two pilot ALCs indicated that most students and faculty members with experience in the rooms responded positively to them. These reactions included an overall enhancement of the student learning experience, a reduction in perceived psychological distance between instructor and students and among students, and praise for the role of the round tables in the ALCs.

The university responded in a way that underscored its commitment to changes in teaching and learning, by including the ALCs in the new Science Teaching & Student Services (STSS) building, which opened in fall 2010. The building can seat 1,639 students in
17 classrooms, including ten ALCs. These rooms, in combination with the pilot ALCs, mean that the University of Minnesota has made one of the largest investments in new learning spaces of any university in the country.

After the STSS building was opened, two controlled comparison studies were conducted in order to examine the contribution of ALCs to students’ academic engagement and learning outcomes. In these studies, faculty members taught two sections of the same class, one in a traditional classroom and one in an ALC, using the same syllabus, materials, instructional methods, and assessment.

Findings from both studies indicated that, after controlling for all relevant demographic and aptitude-related variables, the ALCs improved students’ engagement in the learning process; helped students to outperform final grade expectations, resulting in improved learning outcomes; and affected teaching-learning activities even when the instructor attempted to hold these activities constant.

A third comparison study investigated the question whether the type of pedagogy used in the ALCs matters to student learning. In this study, a faculty member taught the same course twice in an ALC, using the same syllabus, materials, and assessments. The first iteration of the class was largely expository and lecture-based, while in the second iteration the instructor took advantage of the room’s layout and technology by incorporating more active learning techniques into the class. After controlling for numerous demographic variables, students in the second iteration of the course were found to have outperformed those in the first.

Lessons Learned

- Collaborating from the very beginning of the project is paramount.
- Integrating the voices of faculty and the voices of students into the process of planning and assessing is critical.
- Understanding the value of testing and prototyping, in sandbox spaces, of starting small and evaluating at every stage of the process of planning, and implementing different kinds of spaces.

Looking Ahead

We are expanding support to faculty interested in transforming how they teach using the active learning format, and expanding use to other disciplinary fields across the campus.

We are also imagining what the next generation of ALC’s will be.

**Active Learning Classrooms**

*University of Minnesota*

**Photos courtesy of:** Regents of the University of Minnesota

**Executive architect:** Structural/Civil/MEP; Engineering; Landscape architecture: Hammel Green & Abrahamson

**Design architect:** Kohn Pedersen Fox

**Project manager:** Hines

**Construction manager:** McGough Construction

**Location:** Minneapolis, MN

**Net/gross square footage:** 58,938ASF (Total assignable square footage) / 115,000GSF

**Cost:** $69 Million

**Construction period:** January 2009 - August 2010

**Date completed:** August 2010

**Disciplines housed:** General purpose classrooms