# Lessons and Outcomes from University of Minnesota's Future Classrooms

**Active Learning Classroom (ALC) video:**
http://www.classroom.umn.edu/Interactive_Classroom225p.mov

**About the ALCs:**
http://www.classroom.umn.edu/active-learn-room.asp

**About the ALC Partnership and Fall 2007 Report:**
http://dmc.umn.edu/activelearningclassrooms/index.shtml

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Linda Jorn, Director, Office of Information Technology (OIT), Digital Media Center
Jeremy Todd, Interim Director, Office of Classroom Management
Aimee Whiteside, Research and Evaluation Consultant, OIT, Digital Media Center

## Preview

- PAIR-up
- About the University of Minnesota's Active Learning Classrooms (ALC)
- Results of evaluation study conducted in 2007-2008
- Current and Future Space and Evaluation Plans

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## PAIR-up

–**P**artner
–**A**ssess
–**I**ntegrate — **I**nnovatively
–(**R**e)visit

PAIR-up to Design Learning Spaces



## ALC Initiative

- Provost discussion of new STSS Bldg (Dec. 2006)
  - Enhance institutional distinction?
  - How do we build facilities to support the science education of the near and more distant future?
  - How do we ensure the efficacy of a classroom building over its lifetime?
- Pilot project classrooms that are designed as student-centered, integrated, flexible, active learning spaces
- Project objectives:
  - Stimulate interest in new and innovative classrooms
  - Demonstrate new flexible classroom construction techniques
  - Receive faculty and student assessment of new classroom designs and pedagogy

# ALC Design

- Rich technology environment using UM Projection Capable Classroom standard system
- Flexibility to meet changing room size and/or pedagogy requirements
- Ability to flex forward to function as one large active learning classroom based on modified SCALE-UP model
  - SCALE-UP: “Student-Centered Activities for Large Enrollment Undergraduate Programs” a high technology, student centered classroom learning environment
- Ability to flex down to two ALCs or standard classrooms



# About the Active Learning Classrooms

Biological Sciences Center, Room 64

Electrical Engineering/Computer Sciences, Room 2-260

## ALC Features

- Large round tables that seat nine students
- Switchable laptop-based technology
- Multiple fixed flat-panel display/projection systems (one per table)
- Instructor station that allows selection and display of specific information
- Glass markerboards around the entire circumference of the classroom



## ALC Video

Available online:
http://www.classroom.umn.edu/active-learn-room.asp

## About the ALC Partnership

- **Summer 2007**
  - Office of Classroom Management (OCM) invited the Digital Media Center, Office of Information Technology (DMC, OIT) to partner to evaluate the ALCs
- **Fall 2007 and Spring 2008**
  - Formed the Active Learning Classrooms Pilot Evaluation team evaluating a number of course



## Learning Space

- OIT, Digital Media Center (DMC) Services
  - Consultations Services
  - Emerging Academic Technologies
  - Evaluation and Research Services
  - Faculty Development Programs
  - Training Services
  - Usability Services

# Learning Space

- DMC Evaluation and Research Services
  - 3 Research Fellows
  - 3 Tiers of Service
    1. Consultation
    2. Technical Evaluation/Research Assistance
    3. Research Partnership
  - Tier 3 Partnership with Office of Classroom Management



# Why Learning Spaces Research

*American University of Beirut*

We need a process to examine complex interactions between faculty, students, pedagogy, faculty communities of practice, learning outcomes, programmatic planning, and learning spaces.
(Hunley & Schaller, 2009)

## Research Questions

- Faculty attitudes and expectations
- Student perceptions
- Teaching and learning strategies
- Physical features



## Research Methods

- Instructor interviews
- Instructor survey
- Student survey
- Student focus group
- Classroom observations

## Findings: Faculty Attitudes

- Overall positive attitudes
- Changed the learning experience
  - Deepened relationships
  - Shifted to facilitator role
- A few issues arose
  - User interface usability
  - Expectations for computing devices
- Strong desire to stay in this space



## Instructor Comments

- “I loved it. I can’t imagine teaching in a different place. It was just special - a wonderful class - a wonderful experience.”
- “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”

## Findings: Student Perceptions

- Feel connected to their instructor and, especially, to their classmates
- Found effective for teamwork
- Students reported feeling comfortable
- Overall very favorable perceptions



## Student Comments

- "It allows us to be able to be in an intimate environment in such a big classroom. Its really great and we have learned a lot through our group projects."
- "I like the circular tables and the microphones because these help enhance discussion."
- "Anytime we needed to find information on a project we were able to use the laptops to link to the screens and show everyone in the group the necessary information we were looking for"
- "I love this space! It makes me feel appreciated as a student, and I feel intellectually invigorated when I work and learn in it."

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## Findings: Learning Technologies

- Created the environment in which learning could easily occur
- Designed for collaboration and minimized instructor prep time
- Found student display screens helpful for teamwork
- Found round tables were the key, yet all features in tandem supported learning



## Findings: Learning Technologies

| Discipline | Instructional Strategy Employed |
|---|---|
| Aerospace Engineering | Provide an interactive software demo of a 3D object drawing tool |
| Biology | Used the glass markerboards 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 learn a historical story using electronic archival documents |
| Mechanical Engineering | Used the document camera to demo a DC motor and then broke into teams to determine the torque and torque curve |

## Findings: Physical Features

- Recommended this space for other classes (>85%)
- Responded favorably to the physical attributes, including cleanliness, acoustics, lighting, space, and comfort



## Instructor Comments

"Teaching in 64 BioSci was a fabulous teaching experience…A teaching model that centers on student collaboration requires students in groups to be able to interact, and the tables in 64 BioSci accomplished that goal. The projection technology was also very useful, in particular the ability to display to the entire classroom the work being done by individual groups. I also used the document camera for this purpose when students were presenting more traditional "pencil and paper" work. While working in groups, students made great use of the ample whiteboard surface and -- especially -- the large, dedicated monitor each group had available to them."

## Current and Future Plans

- Current phase at University of Minnesota
  - Bush Foundation Grant, 2008-2009
    - Partner – OCM, College of Liberal Arts, OIT
    - Assess – To what extent, if any, do formal and informal learning environments shape teaching and learning practices and student learning outcomes?
    - Innovate – Student Participatory Research (Foster & Gibson, Nixon)
    - Integrate – Face-to-Face Course/Hybrid Course; Physical/Virtual; Faculty/Student Support
    - (Re)Visit – Course Curriculum; New Physical and Virtual Spaces



## Bush Foundation Grant Project

- Modeled around **research teams** for each case study that included:
  - Faculty member
  - Research professional
  - Undergraduate researcher(s)

| Time | Activity | Delivery Mode | Faculty Variables | | Student Variables | | | Room | Descriptions |
|---|---|---|---|---|---|---|---|---|---|
| | | | Podium | Consult | < 20% On-Task | 20-80% On-Task | > 80% On-Task | | |
| 00:00 | O | | + | - | | | X | P+<br>W+ | Houseke eping, midterm date, q uestions<br>Now 37 st udents |
| 00:05 | L<br>GA | PP | + - | - + | | | X | | Explaining group problem on homology, bon es<br>+ 2 st udents |
| 00:10 | GA | PP | - + | + - | | | X | | Group problem, putting answers on board<br>2 people not really discussing |
| 00:15 | GA<br>L<br>QA | PP<br>B? | - + | + - | | | X | | B? = students are using the board ? No t really a delivery…<br>Putting answers on board, not eve ryone's fit<br>Reading off answers |
| 00:20 | L<br>QA | PP<br>B | + | - | | | X | T- | Explaining answers, talking about homol ogy |
| 00:25 | L/QA<br>GA | PP<br>B | - + | - | | | X | | Answers still, homology,e xplaining group answers<br>Another group problem st arted |
| 00:30 | GA | PP | - + | - + | | X | X | P+ | Group problem—similarities in embr yo develop ment<br>One pe rson on the end not discussing with anyone; later two st udents are reading a newspaper/texting on a phone |
| 00:35 | QA<br>L | PP<br>B | + | - | | | X | P+<br>W+ | Discussing answers, explaining anatomy |
| Total | | | | | | | | | |

**Class Observation Form**

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Study Location: _____ Day (Circle One): Su M T W Th F Sa

Assignment: _____ Date: _____

Time Started: _____ AM PM Time Ended: _____ AM PM

**General Characteristics: (Circle one)**

Public / Private

Indoors / Outdoors

Too Quiet / Just Right / Too Noisy

Too Hot / Just Right / Too Cold

Too Bright / Just Right / Too Dim

Too Crowded / Just Right / Too Vacant

Internet Access: Yes / No

Food/Drink Allowed: Yes / No

If yes, are you eating or drink? Yes / No

Smoking Allowed: Yes / No

**Study Characteristics: (Circle one)**

Computer: Yes / No

Books: Yes / No

Notebook/Paper: Yes / No

At Desk/Table: Yes / No

Sharing Desk/Table: Yes / No

If sharing, do you know them? Yes / No

On Couch/Comfy Chair: Yes / No

On Floor/Lawn: Yes / No

In Bed: Yes / No

**Study Diversions: (Circle one)**

Television Playing: Yes / No

Study Alone: Yes / No If no, w/ how many people: _____

If no, teamed together for assignment? Yes / No

Telephone Call: Yes / No How many: _____ Time spent: _____

Text Messaging: Yes / No How many: _____ Time spent: _____

Email: Yes / No How many: _____ Time spent: _____

**Course Assignment Log**

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# Bush Foundation Grant

*Informal Learning Spaces: Participant Photos*



# Bush Foundation Grant

*Informal Learning Spaces: Participant Photos*

Office of Information Technology | www.umn.edu/oit

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# Bush Foundation Grant

**Preliminary Findings: Qualitative**

- Focus groups suggested that the selection of less than ideal informal spaces was not voluntary
- Faculty interviews suggest that round tables facilitate the creation of learning communities
- Positive attitudes towards ALC classroom design
- Preferences for informal spaces generally include convenience, aesthetics, and comfort



# Future Learning Spaces Research Agenda

- Effects of new learning spaces on learning outcomes
- Student preferences regarding informal spaces
- Student responses to new learning spaces
- Effects of new learning spaces on student and faculty in-class behavior

# Future Plans: STSS


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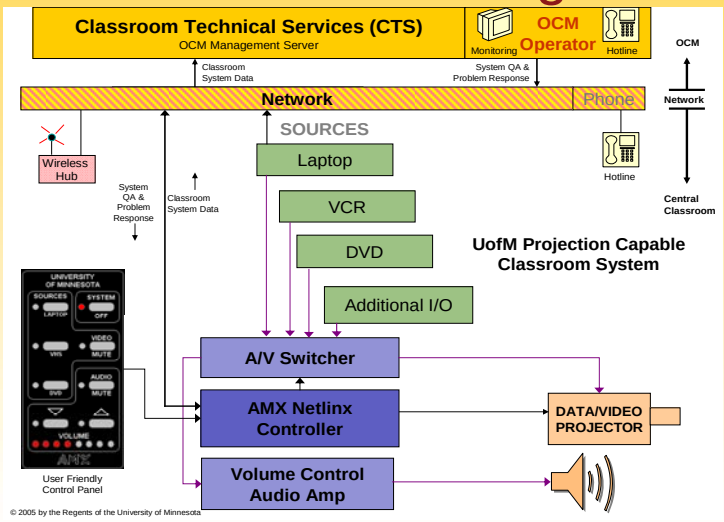
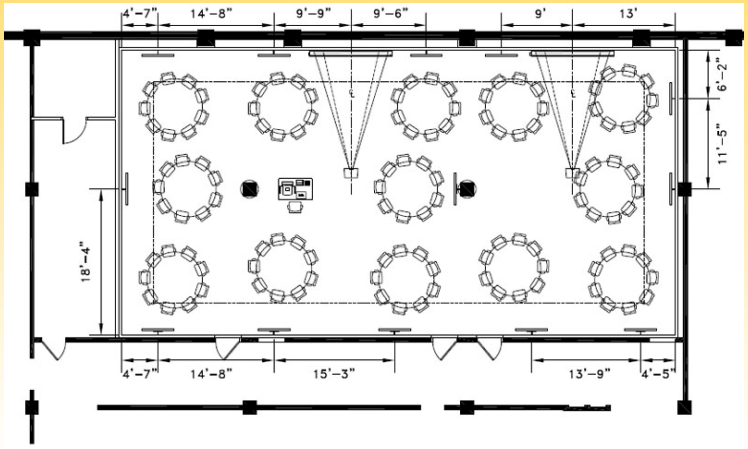
# Slide 5 – PCC diagram

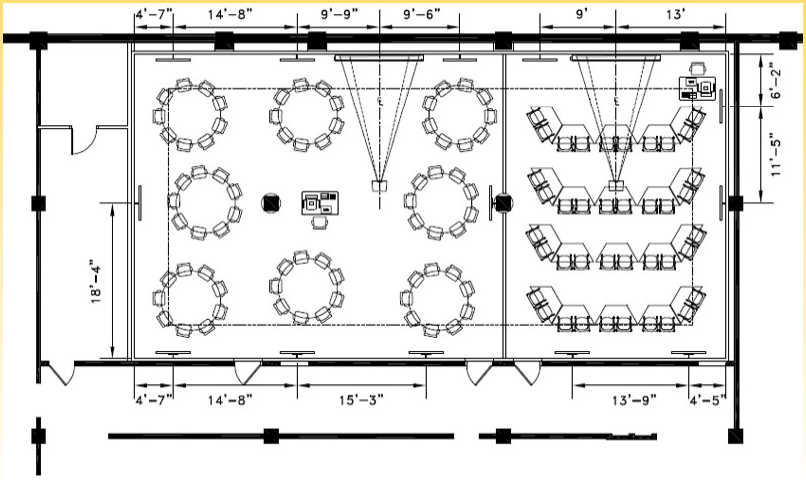





# Slide 5 – "Flex-up" Room



# Slide 5 – “Flex-down” Room

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