Leveraging Research to Transform STEM Teaching & Research Environments

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Introductions

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Define
Building committee
/ Project goals

1. **Enhance** the science and engineering programs

2. Promote **integration** across science and engineering

3. Create a facility that fosters **interdisciplinary interaction**

4. Significantly increase the **visibility** of scientific and engineering exploration

5. Creating an **appealing place** for students.
Solve
Project statistics

- Completed in 2014
- Two phases of major construction
- Houses eight departments:
  - Biology
  - Chemistry
  - Computer Science
  - Engineering Science
  - Geosciences
  - Mathematics
  - Physics
  - Psychology
- 157,000 GSF New Construction / 93,000 GSF Renovation
Project statistics

- 24 Teaching Labs: 27%
- 43 Research Labs: 17%
- 86 Informal Learning Areas: 12%
- 12 Classrooms: 12%
- Informal Learning Areas: 6%
- 12 Classrooms: 26%
- 43 Research Labs: 17%

Total: 100%
Design concepts

- North-south spine
- Entry courtyard
- Transparency
- Interaction
- Informality
Design concepts

• Campus fabric
• Spirit of place
• South Texas climate
// Interdisciplinary connections
Interdisciplinary connections
/Stacking concepts

Marrs Mclean
- Addition: 46,790 nsf New

Phase 2
- New: 30,800 nsf

Cowles
- Renovation: 39,615 nsf

Legend:
- Biology
- Chemistry
- Computer Science
- Engineering Science
- Geoscience
- Physics
- Psychology
- Shared - Classrooms
- Shared - Clusters
Broadway connecting the disciplines
The “Cube” connecting entrepreneurship

THINKING
Comfortable, flexible, lounge-like space that lets ideas take flight.

MODELING
This computer lab is a technology-intensive space that does double duty as a teaching and open lab enabling individuals and teams to interactively utilize digital tools for visual modeling.

MAKING
A space that allows students to utilize a wide range of tools from post-its to interactive whiteboards, to hand-held tools for brainstorming and prototyping.
// Water connecting building and nature
Water connecting building and nature
Validate
 Architects are not research scientists
Partnering with an expert
Is there more interest in STEM?

Incoming Class?
Are there more first year students?

In Engineering?
Are there more majors?

In Biology?
How Often Have You Entered the Building?

Never?

33% Before CSI

1% After CSI
How Often Have You Entered the Building?
Four or More Times a Weeks?

33% Before CSI
95% After CSI
Why do students go to the STEM Building(s)
Study or do homework alone.

Before CSI

- 44% STEM
- 8% Non-STEM
Why do students go to the STEM Building(s) Study or do homework alone.

After CSI

84% STEM

63% Non-STEM
Student Ratings of the STEM Building
As a place to study

One of last places of choice
Acceptable
Good
One of favorite places
Student Ratings of Importance of Attractive Place to Study (Average Rating From 1= Very Poor to 5= Excellent)
When we asked Students what to improve, their top 3 requests were:

**More Space!**
Add more study/work spaces

**More Food!**
Keep the café open later at night

**Accessibility!**
Greater access to classrooms and labs
Student Ratings of Classrooms
(Average Rating From 1= One of worst to 5= One of best)
Faculty Ratings of Classroom Features
(Average Rating From 1= Very Poor to 5= Excellent)
Faculty Ratings of Teaching Labs
(Average Rating From 1= Very poor to 5= Excellent)
Faculty Ratings of Teaching Laboratory Features
(Average Rating From 1= Very Poor to 5= Excellent)
New teaching labs promote new styles of teaching
More than ½ of faculty report changing pedagogy

- 73% Faculty: Flexibility in accommodating different teaching styles or strategies
- 85% Faculty: Overall quality as a teaching environment
“The new space just makes what I was trying to do before about a bajillion times easier!!!!
Faculty Ratings of Research Labs
(Average Rating From 1= Very poor to 5= Excellent)
Faculty Ratings of Research Laboratory Features...
(Average Rating From 1= Very Poor to 5= Excellent)
they [the new research labs] have “improved the research culture...at Trinity”

Over 70% of faculty reported that they can carry out research more quickly and efficiently in their new labs
Effective Interaction
In CSI a **majority of faculty** reported meeting students outside of their office, classroom or laboratory. Before CSI faculty reported a lack of public spaces to meet with students.
How Often Do You Have a Conversation with a faculty member in another department?

Two or More Times a Month?

- Before CSI: 32%
- After CSI: 55%
Before CSI 37% / After CSI 72% of all students surveyed reported using the informal spaces to study or work on problems together

Over 65% of students reported using informal spaces to discuss ideas from class
Cycle
Define
Increase Visibility

Validate
50% of the incoming class has expressed an interest in STEM

Solve
Put cool tools on display

Lessons Learned
Define
Create an appealing space for students

Solve
Provide density of informal learning area, equal to 12% of NSF

Validate
95% of student at Trinity enter CSI 4+ times a week

Lessons Learned
Define
Foster interdisciplinary interaction

Validate
70% more faculty reported interacting with a faculty colleague from another department

Solve
Create convenient opportunities for intellectual collisions

Lessons Learned