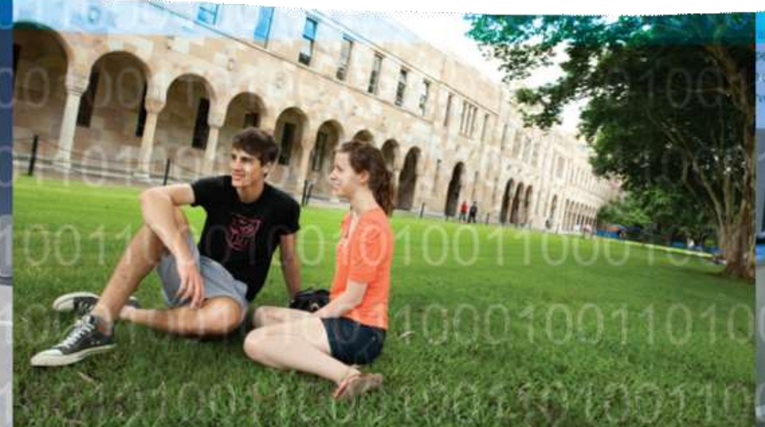
THE UNIVERSITY OF QUEENSLAND

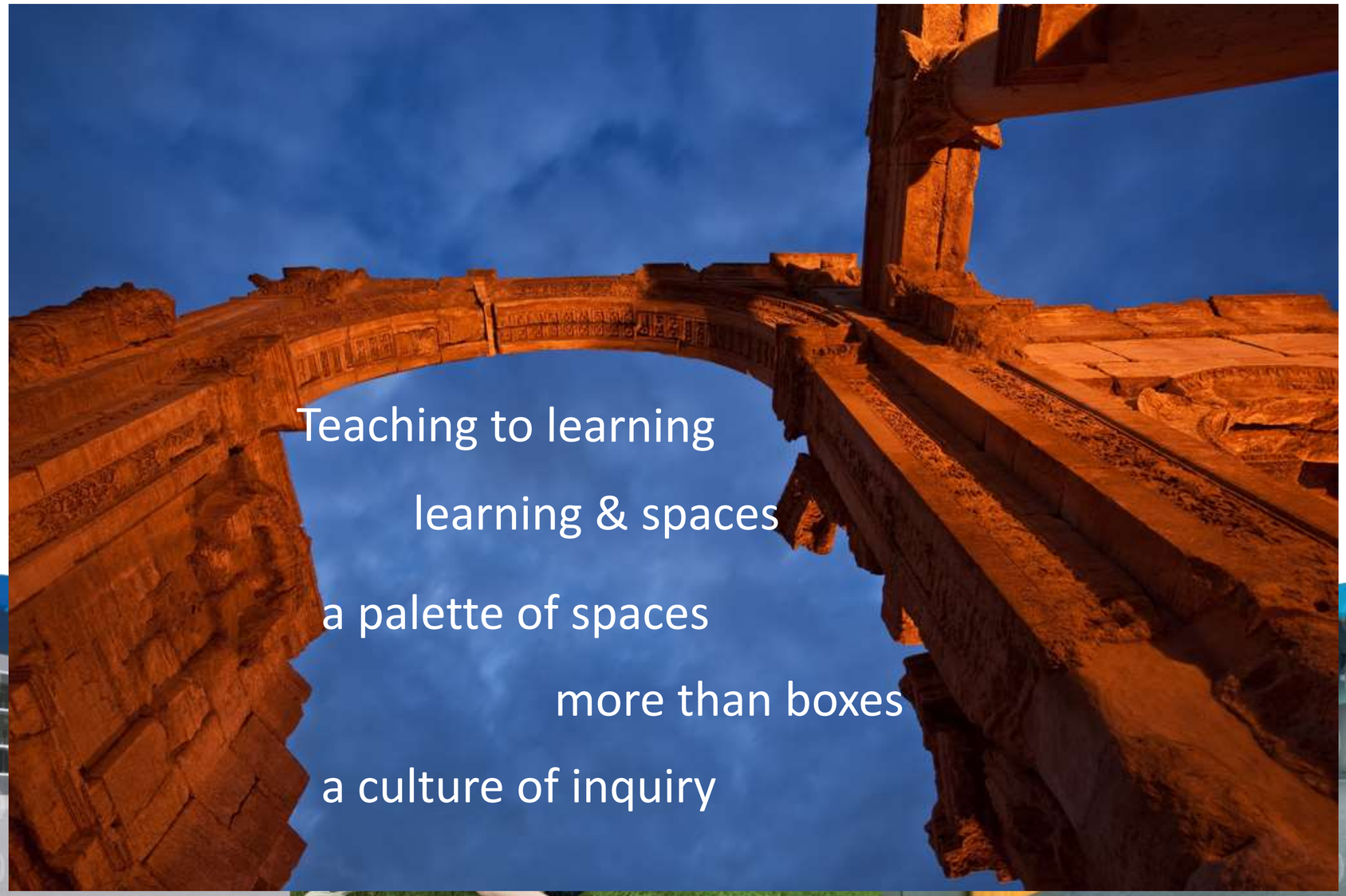
Just Do It: Prototyping Toward Progressive Renovation of Learning Spaces

CENTRE FOR EDUCATIONAL INNOVATION & TECHNOLOGY

Prof. Phillip D. Long
Director



Where I hope we'll go today...



The Shift from teaching to learning (Barr & Tagg, 1995)

http://critical.tamucc.edu/~blalock/readings/tch2learn.htm

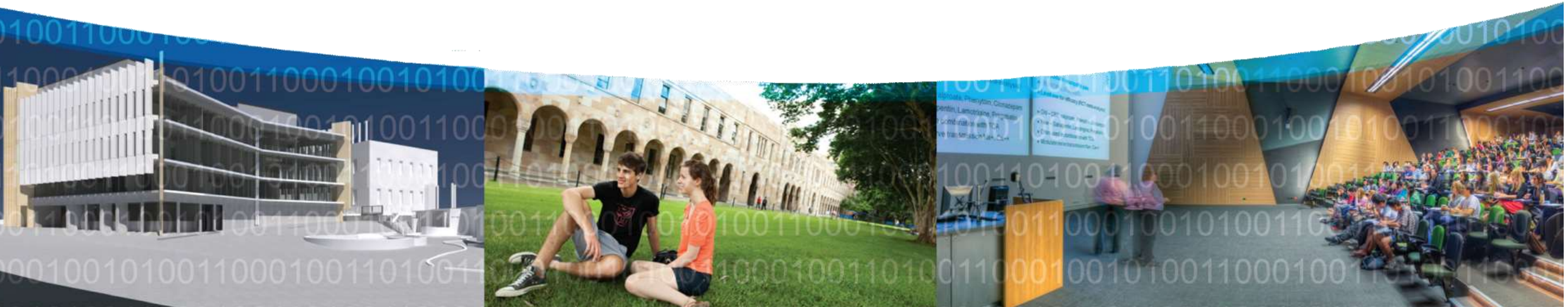
Instructional paradigm to the learning paradigm.

Begin with what we want students to be able to do at the end

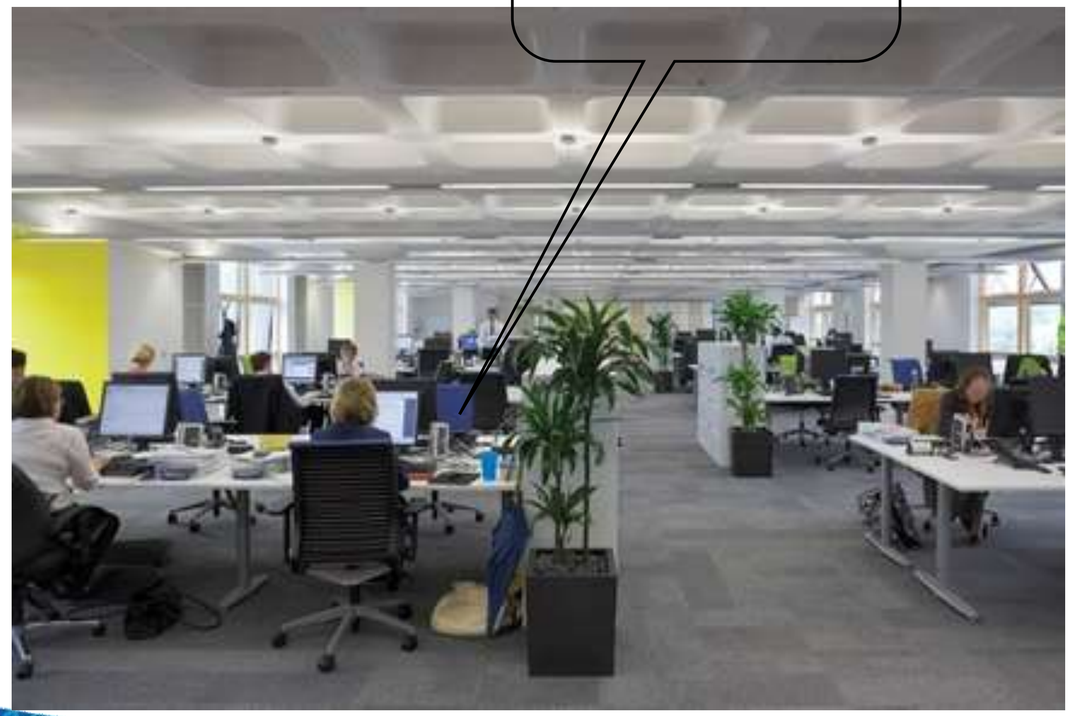
and design to get there

The Problem of Learning

How do we make formal learning environments more like practice-based learning environments?



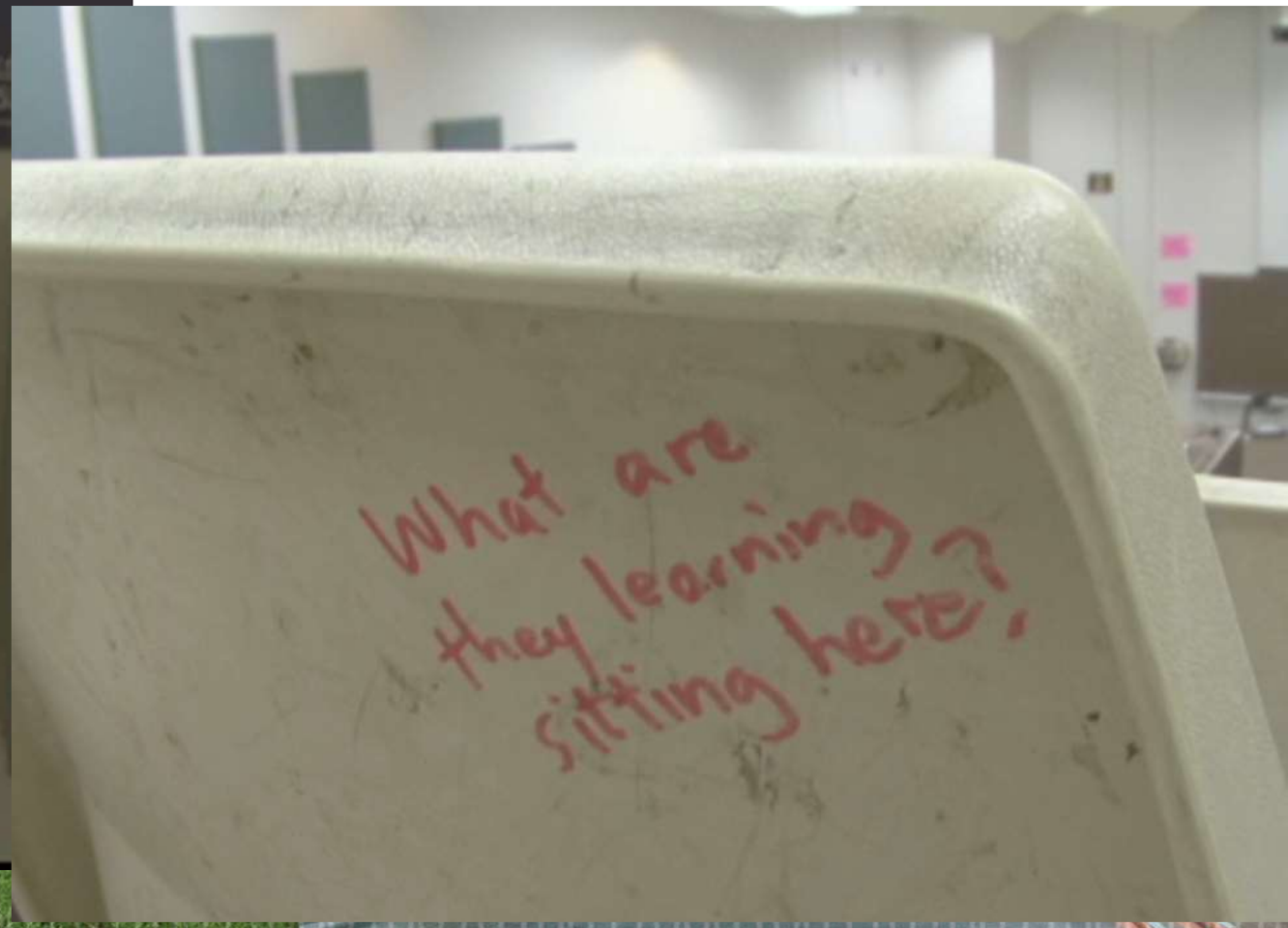
Is Learning really influenced by the environment?



Low ceiling

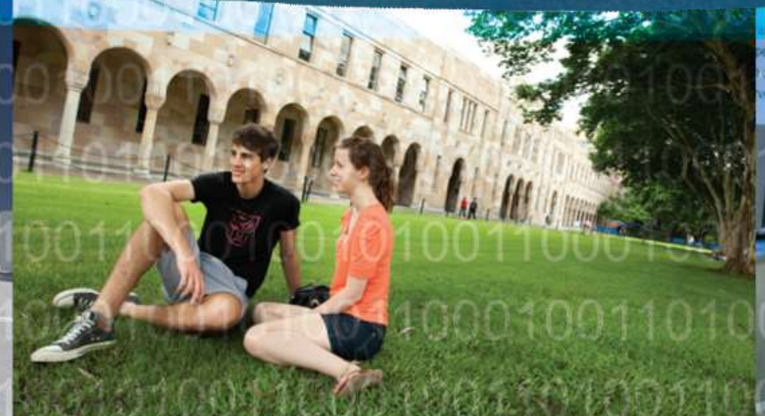
High ceiling

What do the spaces use for teaching say about learning?



Pause

"A Vision of Students Today" - http://www.youtube.com/watch?v=dGCJ46vyR9o



Learning environments


Lecture


Active Learning


Computer Lab


Informal Study

Prototyping Space


Engineering Lab

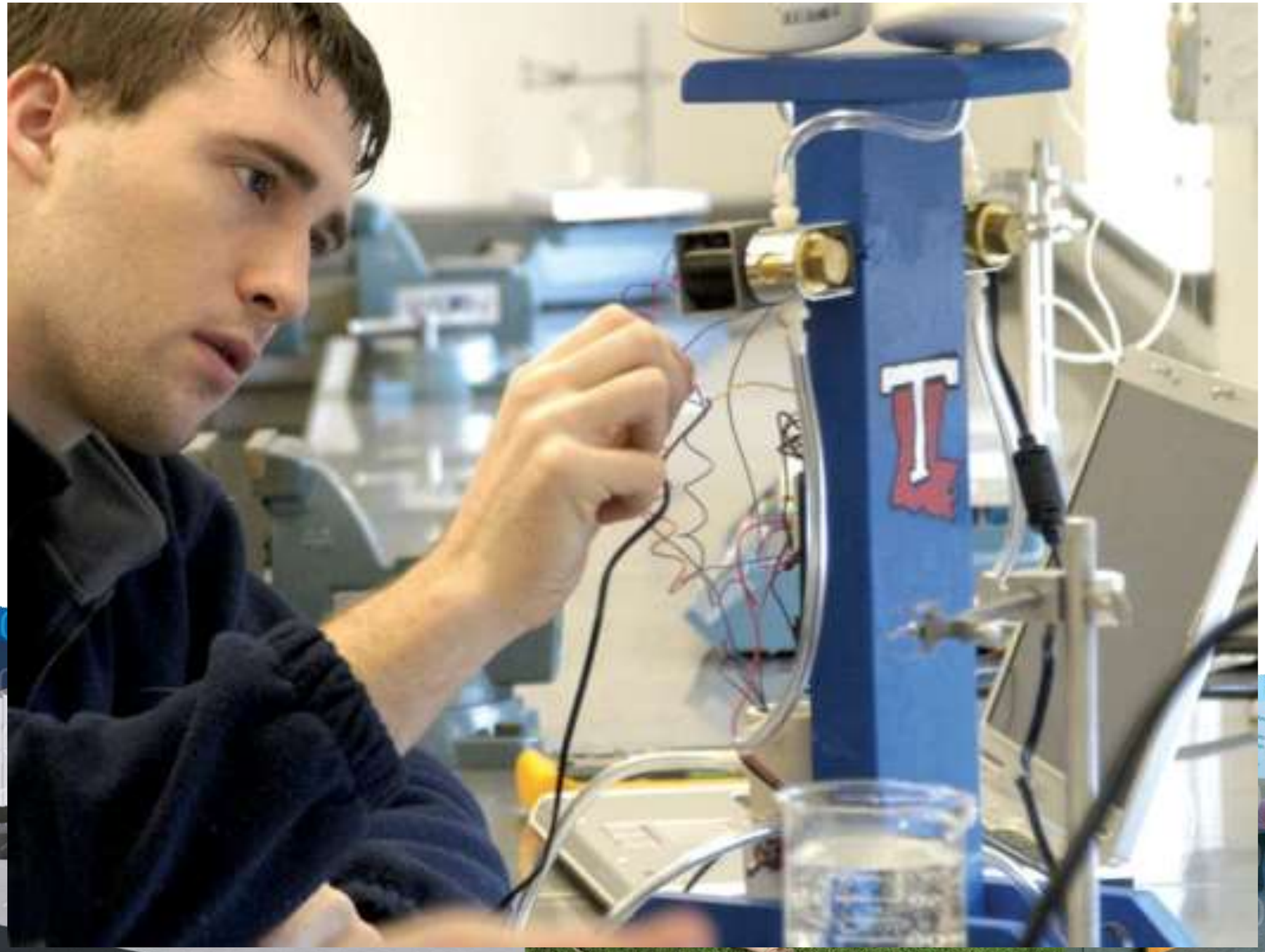

Performance Space


Group Study
Critique Space

A palette of spaces

- the Personal Lab
- Minimalist
- Active Learning
- Specialised Spaces
- Virtual SpacesLab Spaces PerformanceNon-formal

- sanctuaryLab spaces
- Group Study
- prototyping



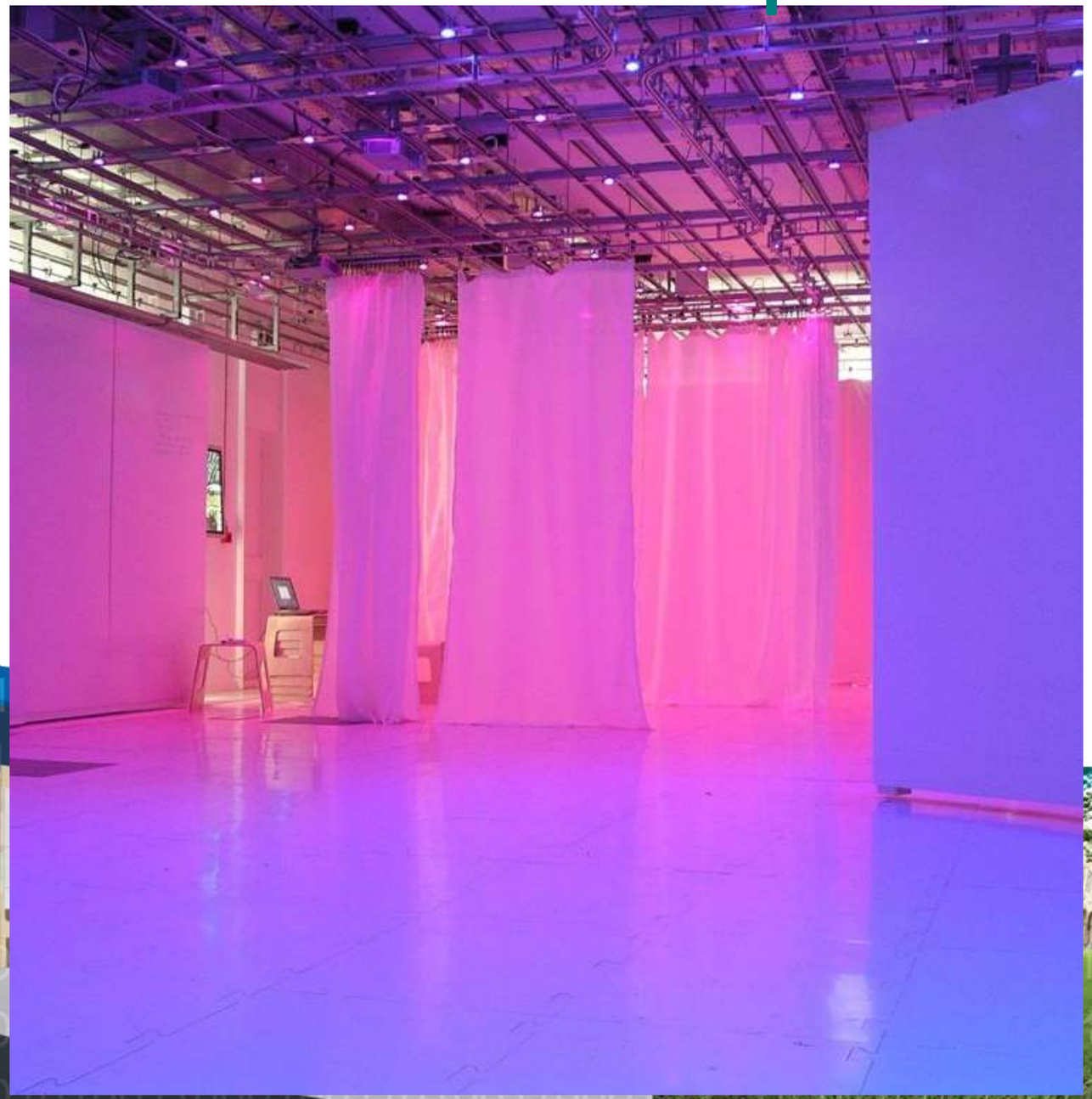
Personal Lab

a laptop
tool kit (multimeter, dial calliper
wire strippers, etc.)
software - Mathcad, Solidworks,
MS Office
Robot kit - (Boe-bot)

http://www.parallax.com/tabid/411/Default.aspx

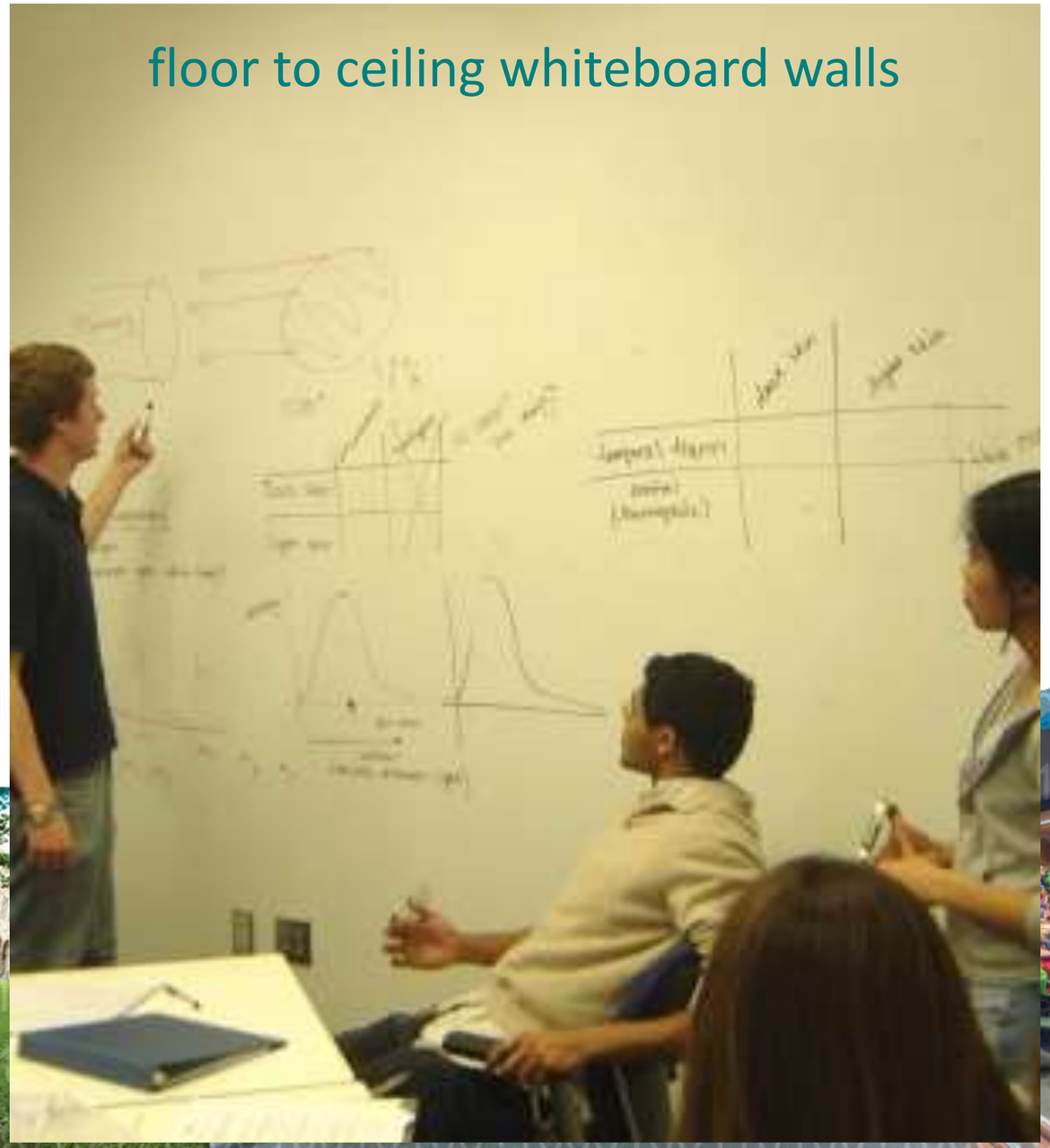
Louisiana Technical University

Minimalist Spaces



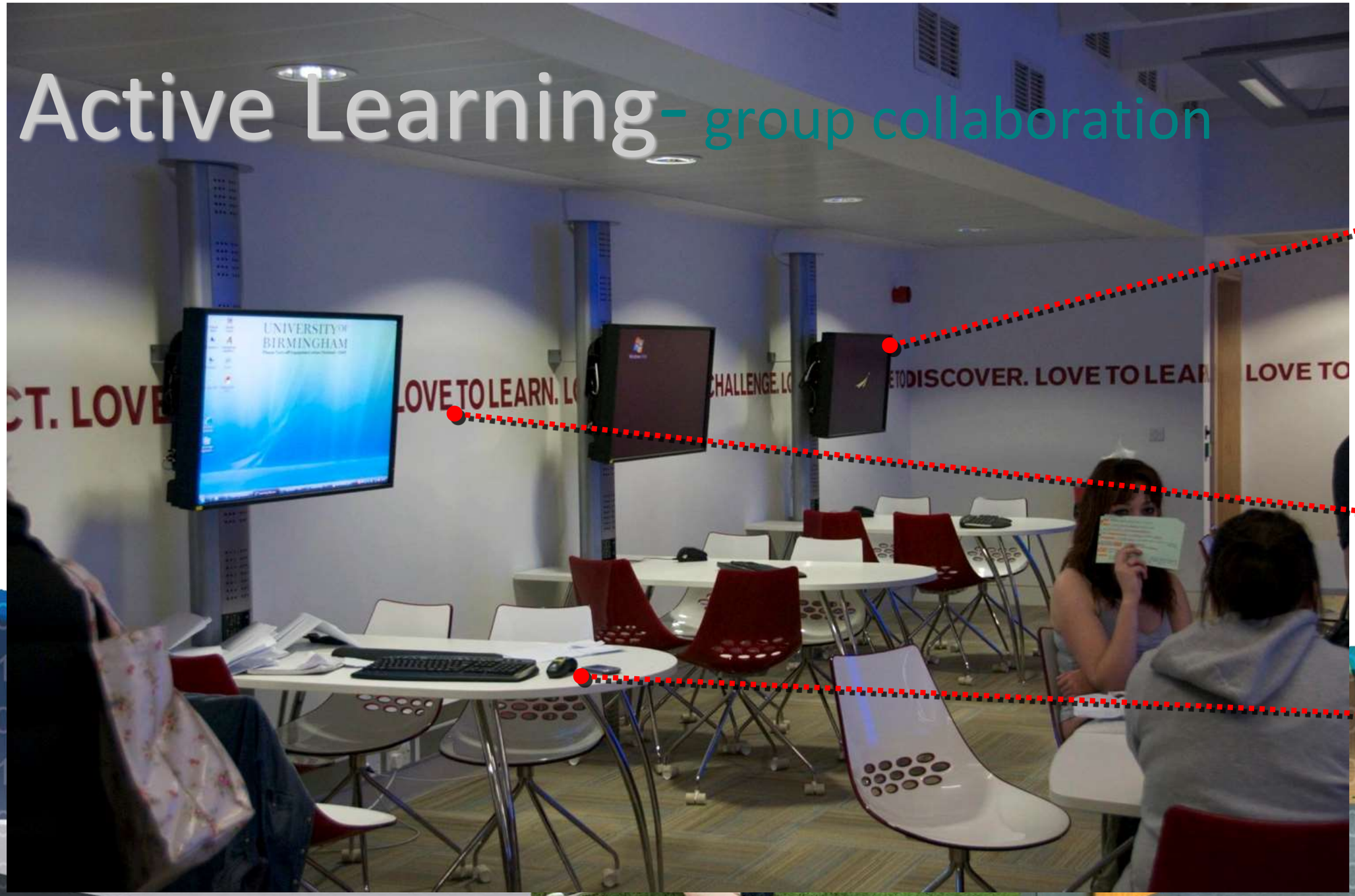
Minimalist Spaces

Georgia Tech University



floor to ceiling whiteboard walls

Active Learning- group collaboration

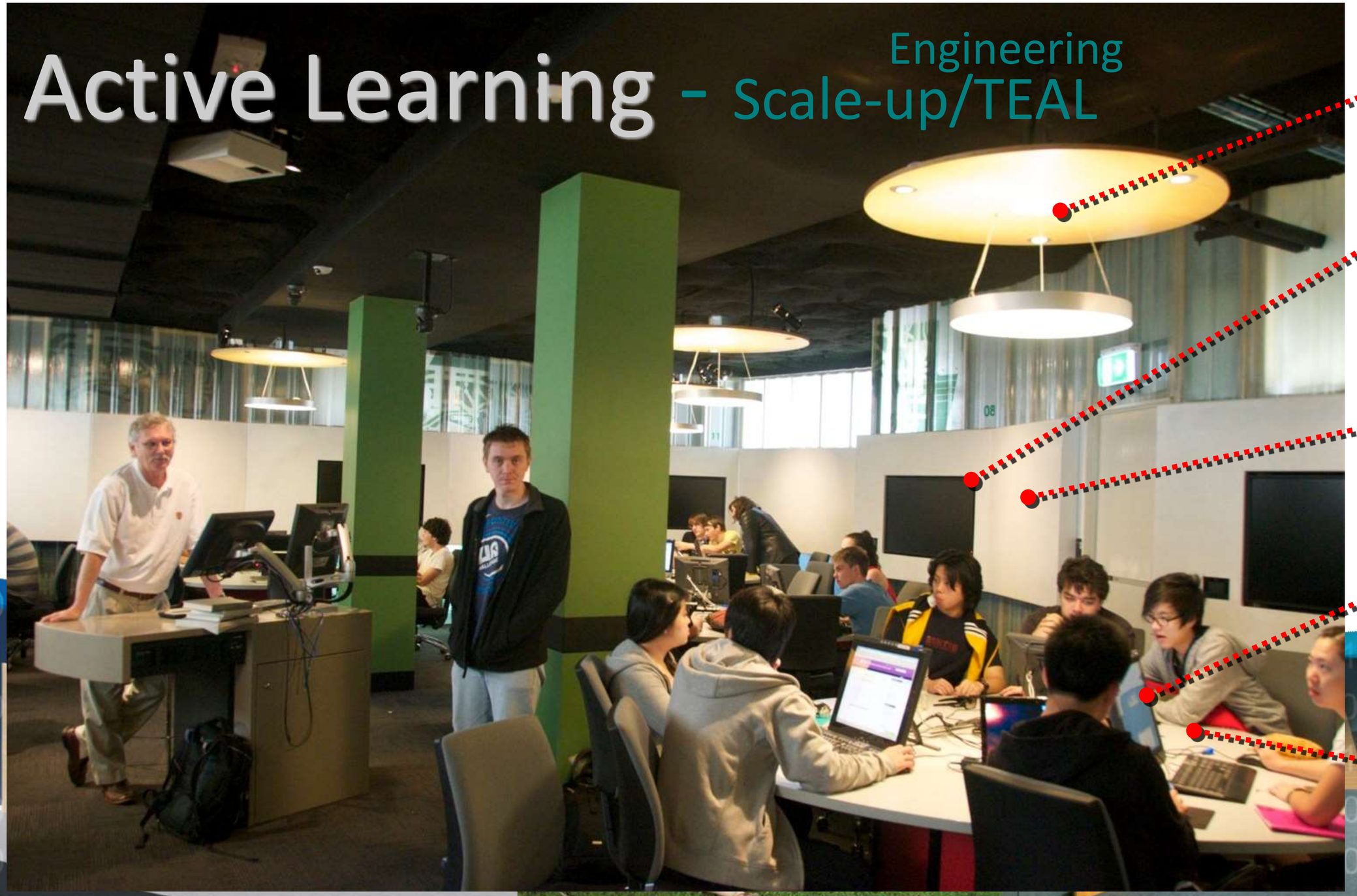


Team screens

Messaging intent

PC per table

Active Learning – Engineering Scale-up/TEAL



Task lighting

Screen per team

Whiteboard ribbon

3 PCs per table

Tables of 9 Teams of 3

Specialised Group Spaces

Terraces

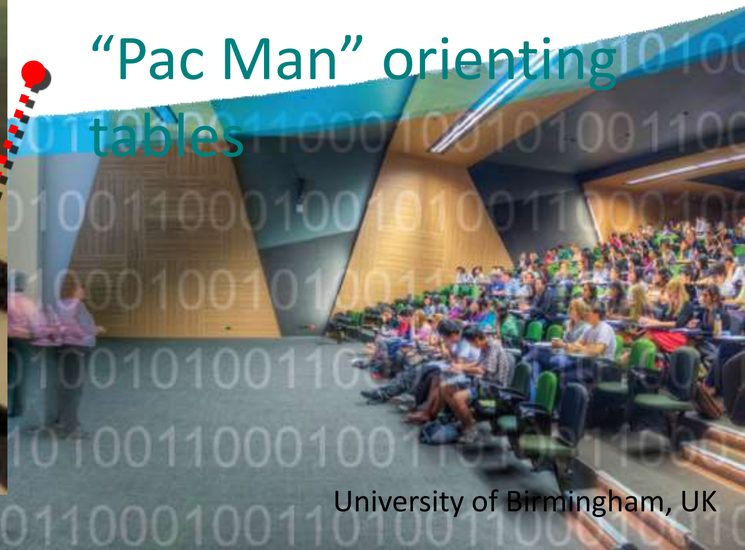
Teams

Orientation

University of Birmingham, UK

Specialised Group Spaces

- Observation cameras
- Whiteboard per team
- Screen per group
- Flexible Fume hood
- “Pac Man” orienting tables



University of Birmingham, UK

QWAK @ Duke Uni.

Bettina Scheucher

Virtual spaces

Virtual spaces

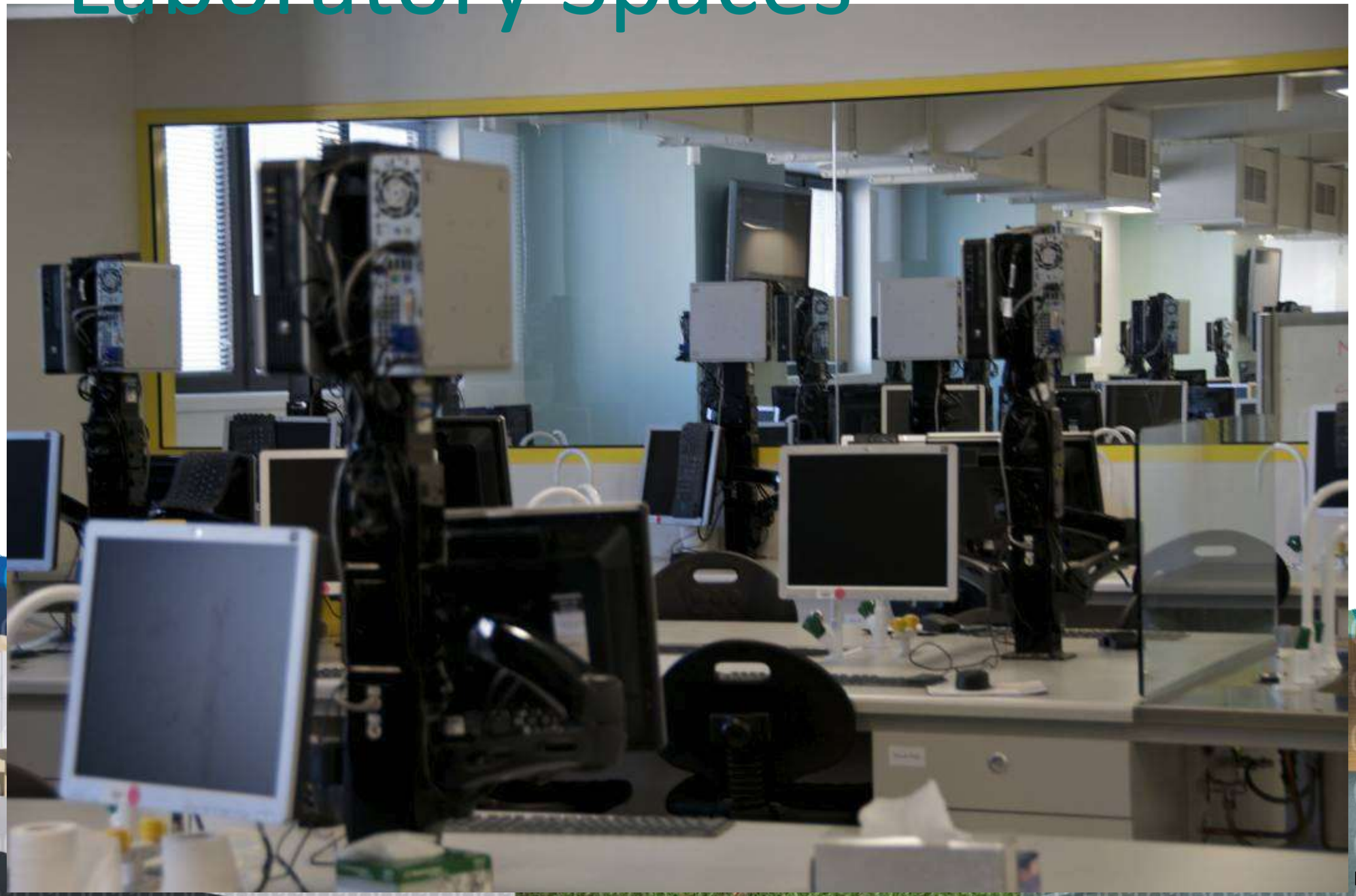
MasterClass in Piano between Yale University & the University of Queensland

Sanctuary Outdoor Spaces

Sanctuary Spaces

High Line Park, NYC

Laboratory Spaces



Biosciences Lab

(wet lab)

Laboratory Spaces

Engineering Lab

“Integrated Learning Lab”

University of Colorado Boulder

Performance Spaces

Kresge Auditorium, MIT

Performance Spaces

Federation Square, Melbourne

Non-Formal Learning Spaces

Shared Screen

Movable Chairs

USC

Non-Formal Learning Spaces

Ad hoc study rms

“Club style” study spaces

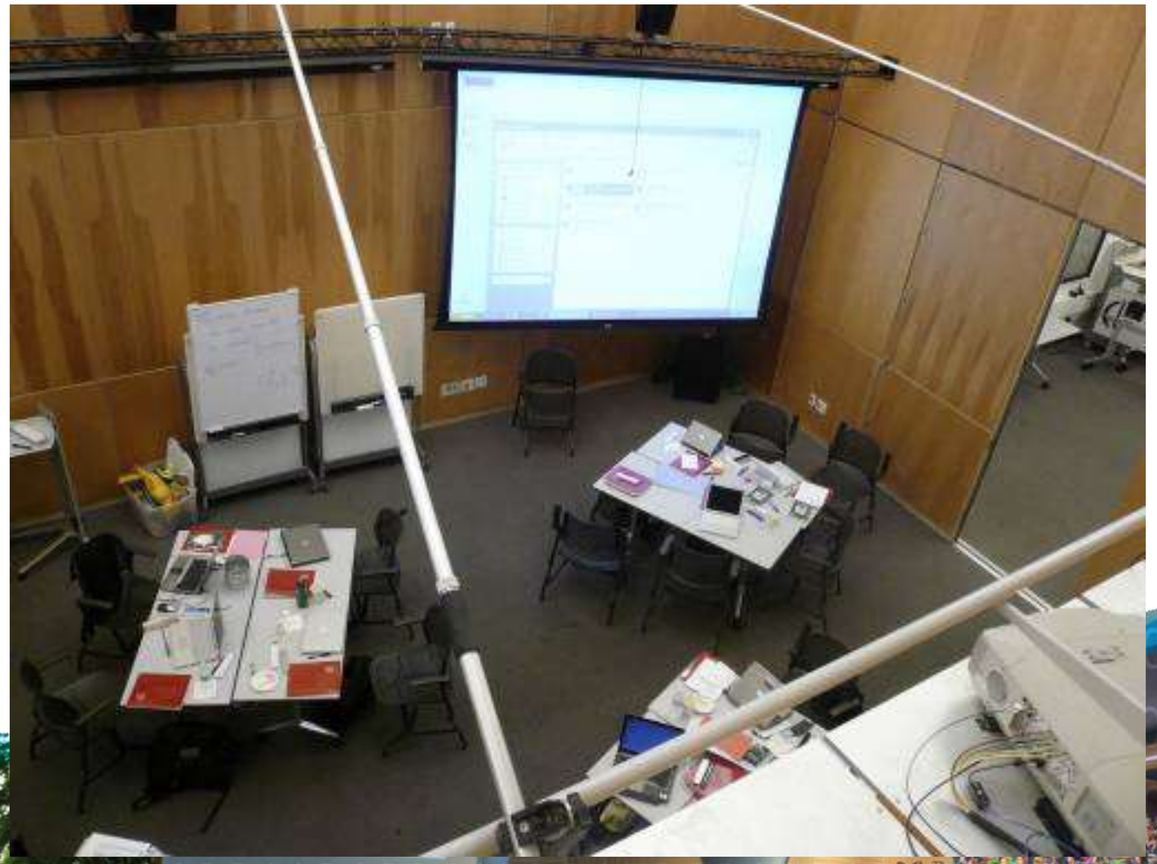
USC

Group study spaces

Group study spaces

University of Derby

Prototyping Spaces



Stanford University

Pause

Learning spaces also have a temporal dimension

Learning spaces, when well designed, serve the academic enterprise

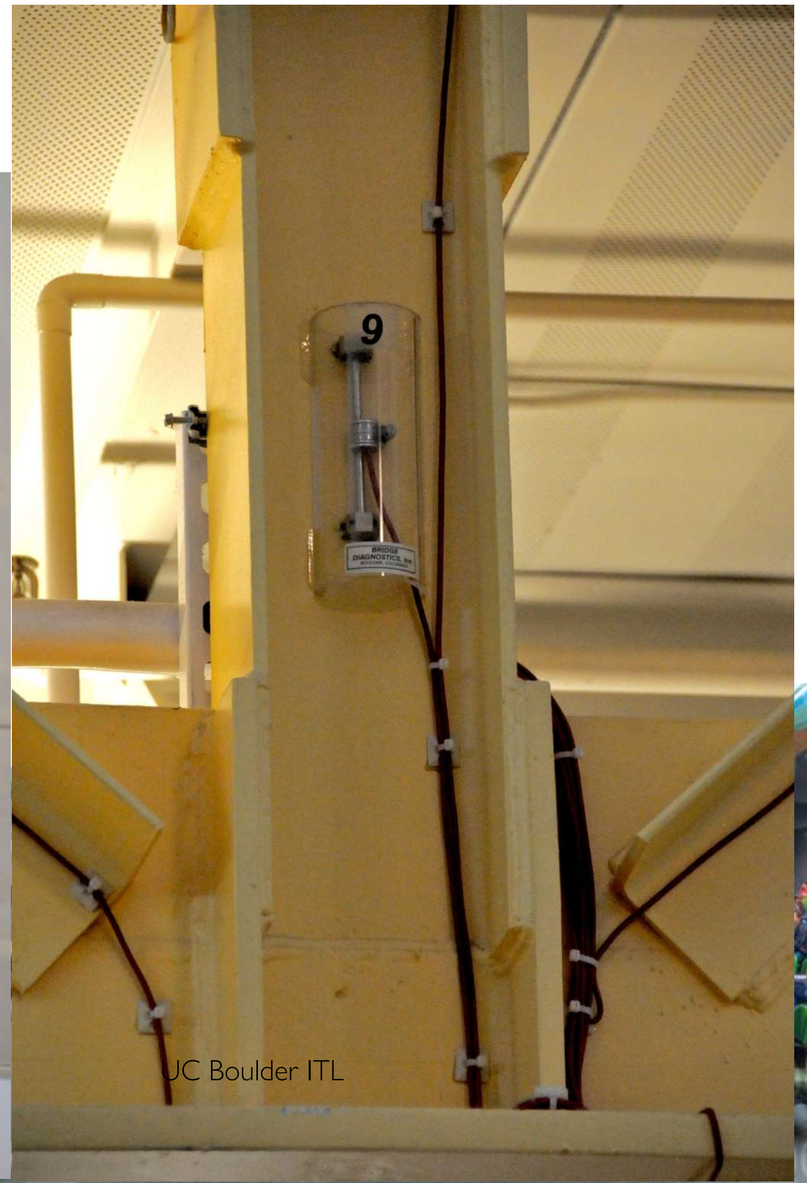
Stanford Wallenberg Hall - during the day

But learning Spaces need to be re-thought in terms of their use across a 24 hour day

Stanford Wallenberg Hall - at night

Built environments as a learning back channel

UC Boulder ITL



UC Boulder ITL

Listening to the physical world

Live Environments 1.0

Access the data

Contact, About

interpolated data. Advanced statistical analysis is also available. There are 6000 data points in total, so not all of them are available here; if you would like something included that isn't listed, please contact us. Alternately, you can download a more advanced graphing and analysis tool from the sidebar (within Queen's Campus only).

GREEN TIPS

Wrap your electric water heater with an insulating blanket. A water heater blanket will add to the existing insulation and reduce heat loss. Be sure it's CSA certified for use on all CSA approved electric water heaters set between 49-60°C (140°F).

n/a

CHOOSE DATA POINT AND RANGE

Select an item

START DATE: 10-Nov-10 (dd-Mon-YY (08-Aug-06))

START TIME: 5:51 (24h format (19:00))

END DATE: 10-Nov-10 (dd-Mon-YY (09-Aug-06))

END TIME: 7:51 (24h format (23:00))

TIMING & STATISTICAL ANALYSIS

- Original Values
- Interpolated Values
- Average Std Dev
- Minimum Maximum
- Mean (event-weighted)

Period: 5 min

RESULTS

Get Values

Values will need to be saved in a text file with the extension .CSV. Then they can be opened in any program. If a timeout occurs, try reducing the date range or increasing the interval.

RESULTS

```
Table: Interpolated
Step interval: 5m
From: 10-Nov-10 5:51
To: 10-Nov-10 7:51

ILC.Power.Watts (Watts)

2010-11-10 05:51:00, 94718.000
2010-11-10 05:56:00, 95381.000
2010-11-10 06:01:00, 96140.000
2010-11-10 06:06:00, 96978.000
2010-11-10 06:11:00, 97414.000
2010-11-10 06:16:00, 100814.000
2010-11-10 06:21:00, 106533.500
2010-11-10 06:26:00, 114252.000
2010-11-10 06:31:00, 116638.750
2010-11-10 06:36:00, 118320.000
2010-11-10 06:41:00, 122708.000
2010-11-10 06:46:00, 125896.000
2010-11-10 06:51:00, 129420.125
2010-11-10 06:56:00, 129227.000
2010-11-10 07:01:00, 131214.000
2010-11-10 07:06:00, 142320.000
2010-11-10 07:11:00, 144009.750
2010-11-10 07:16:00, 142706.000
2010-11-10 07:21:00, 146834.000
2010-11-10 07:26:00, 151357.328
2010-11-10 07:31:00, 158059.000
2010-11-10 07:36:00, 156808.000
2010-11-10 07:41:00, 149264.000
2010-11-10 07:46:00, 146764.000
2010-11-10 07:51:00, 150724.000
```

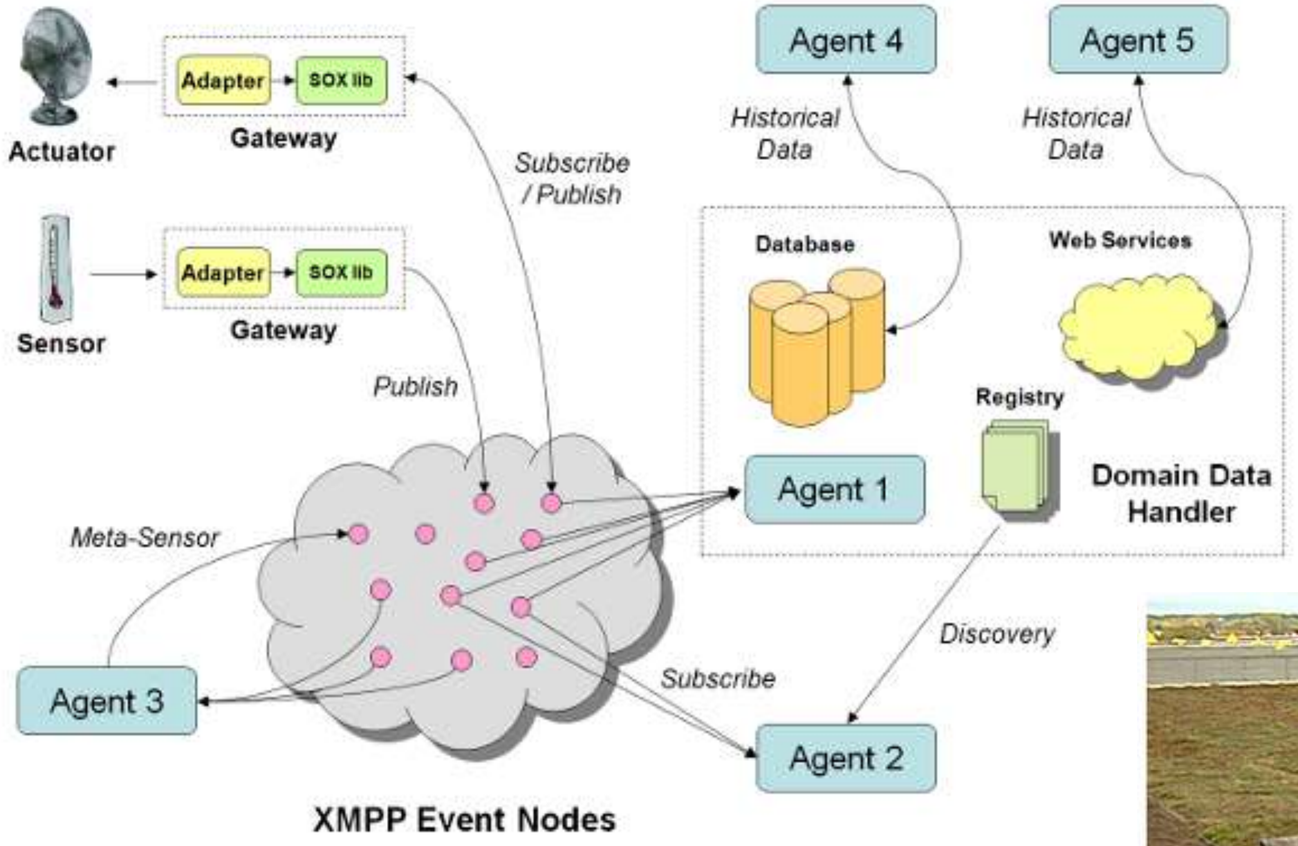
Copy values to clipboard

Getting data

Queen's University Live Building

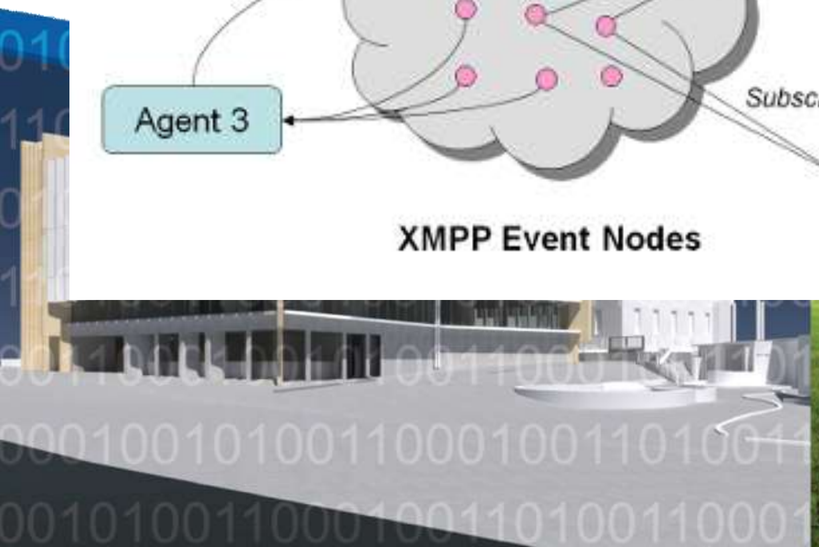
from "push"...

Live Environments 2.0



To “Pull”

- subscribing to data for personal devices

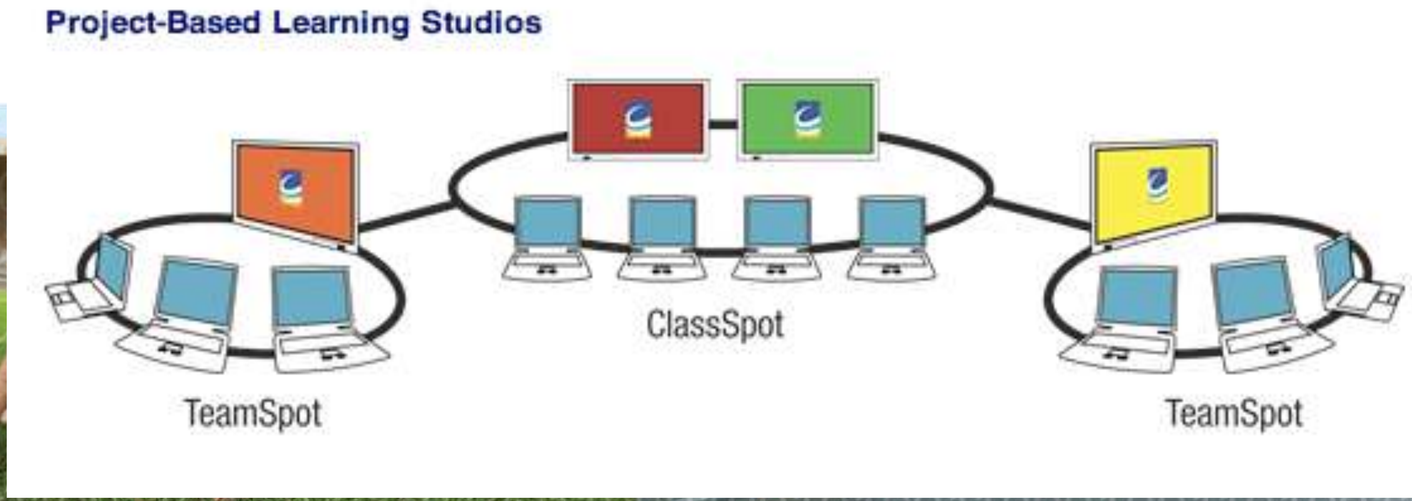


The Transition to Software Infrastructure

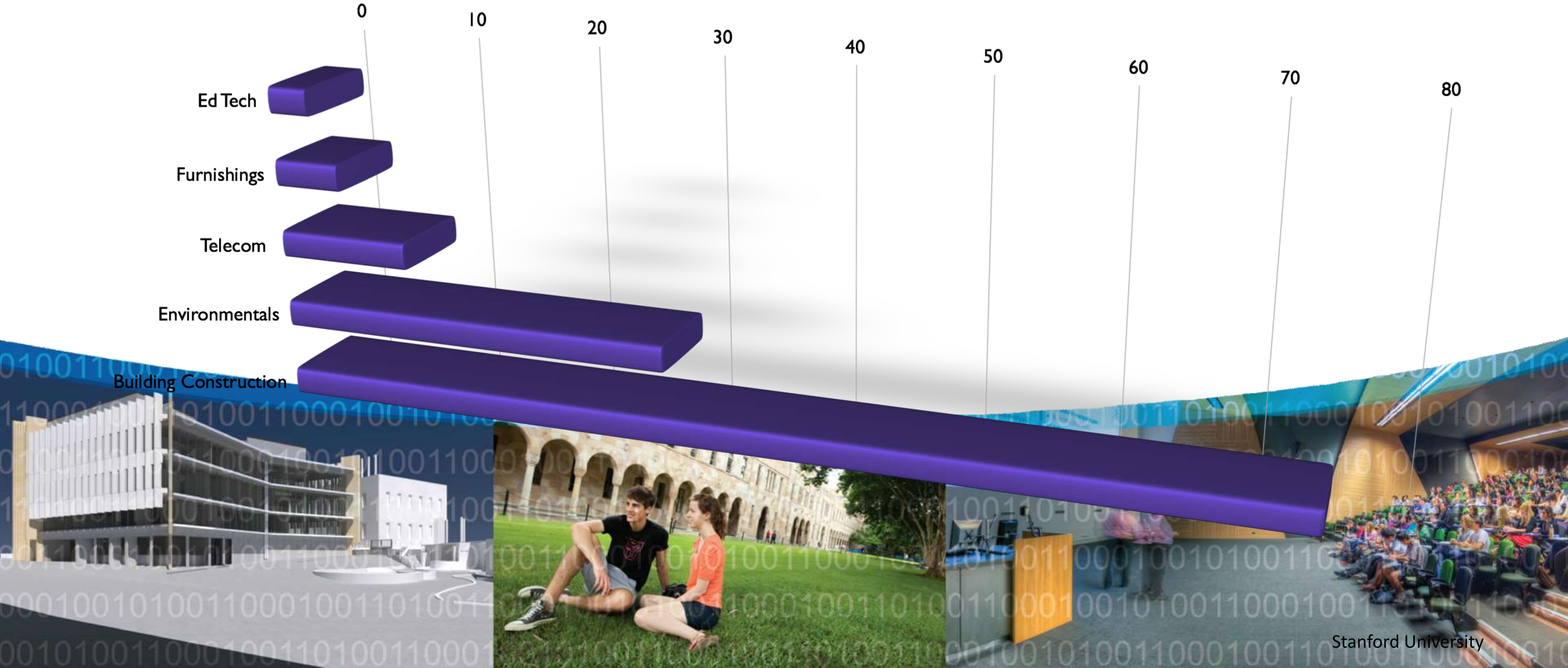
The Transition to Software Infrastructure

The Transition to Software Infrastructure

Routing presentation video by hardware switches vs. software



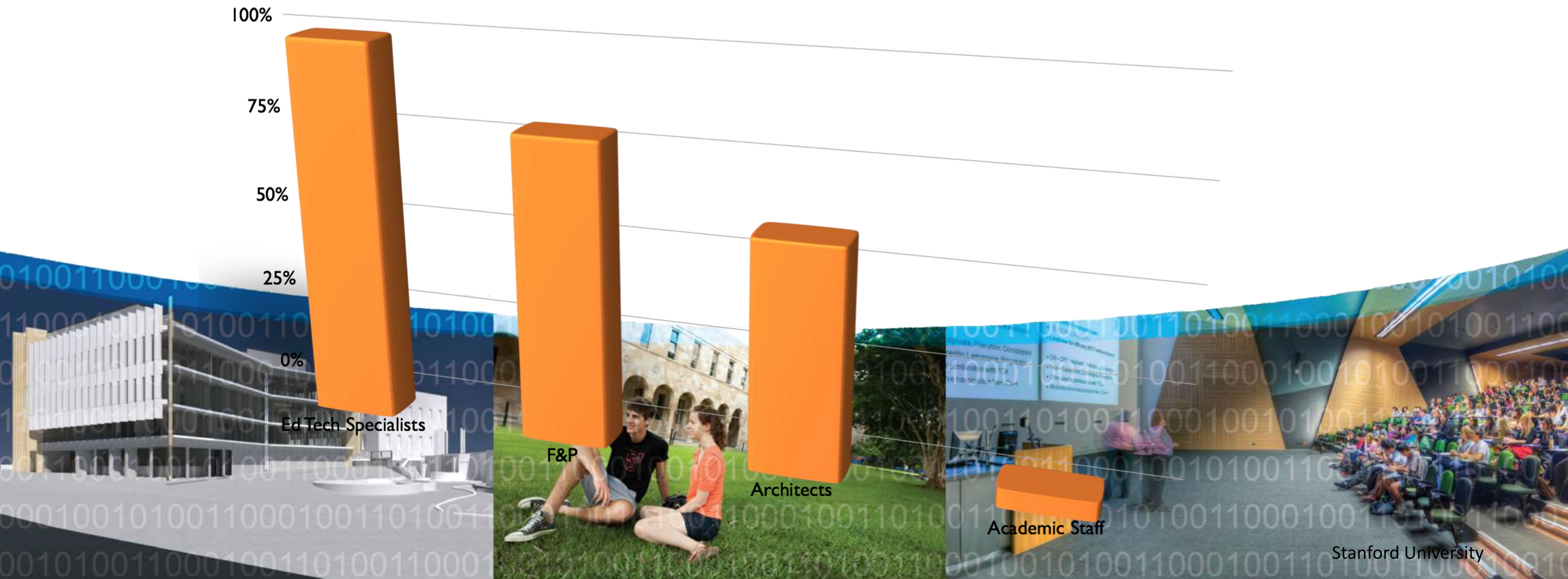
Relative rates of obsolescence



Stanford University

Finding a Common Language

Relative focus on the issues of technology and AV in learning spaces

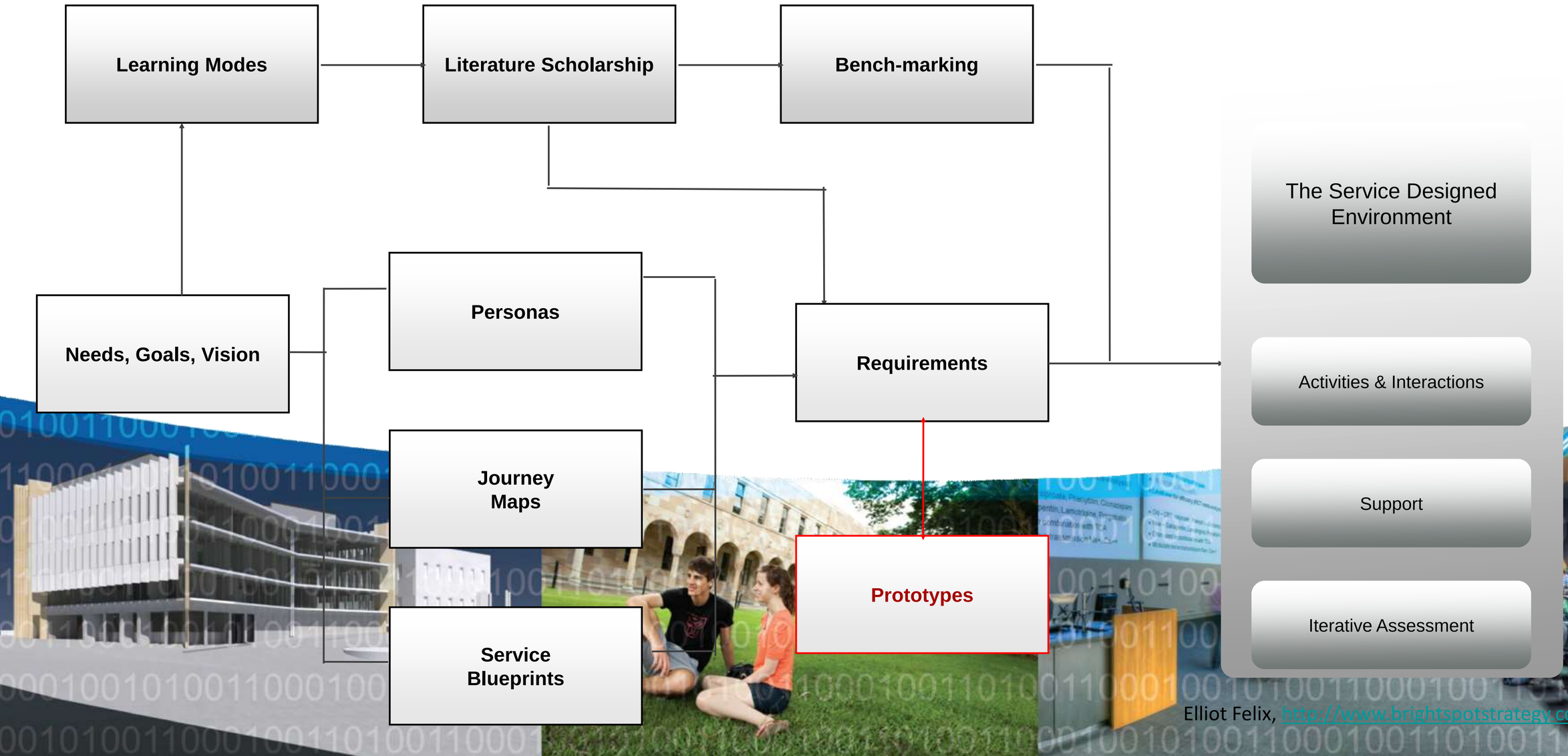


Pause

Building a Culture of Active Inquiry

Built on passion in spaces that inspire itWhere recreation becomes an act of re-creation & remix through engaged learning (JSB)

Re-Thinking Process



Elliot Felix, http://www.brightspotstrategy.com/

Learning Activities

Class Lab Mode
-Occasional use
-Week duration
-Storable

Large Class Project Mode

-Year scale
-Design intensive
-Dedicated space
-Product thrust
-Close connectivity to outside

Design Project Mode

-Large scale project
-Term length
-Virtual design
-Dedicated space
-Breakout / report-back space

Tinkering Mode
-Occasional
-Temporary work space

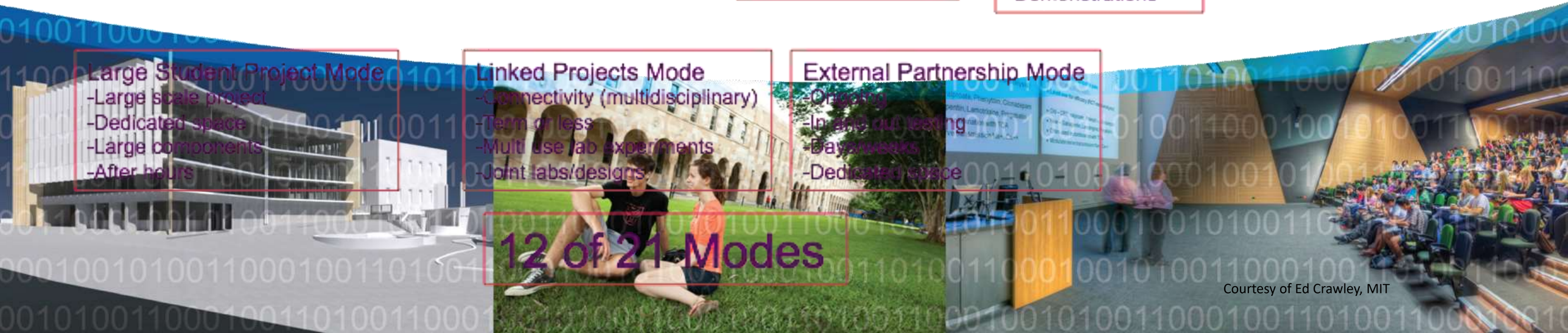
Outreach Mode
-Weekly
-Accommodate visits, lectures, presentations

Independent Study
-Desktop project
-1 to 2 terms
-Student developed

Research Design Support Mode
-In and out capability
-Temporary design space use by team
-Weeks to months

Thesis Mode
-1+ years
-Equipment needs
-Dedicated space
-In and out capability

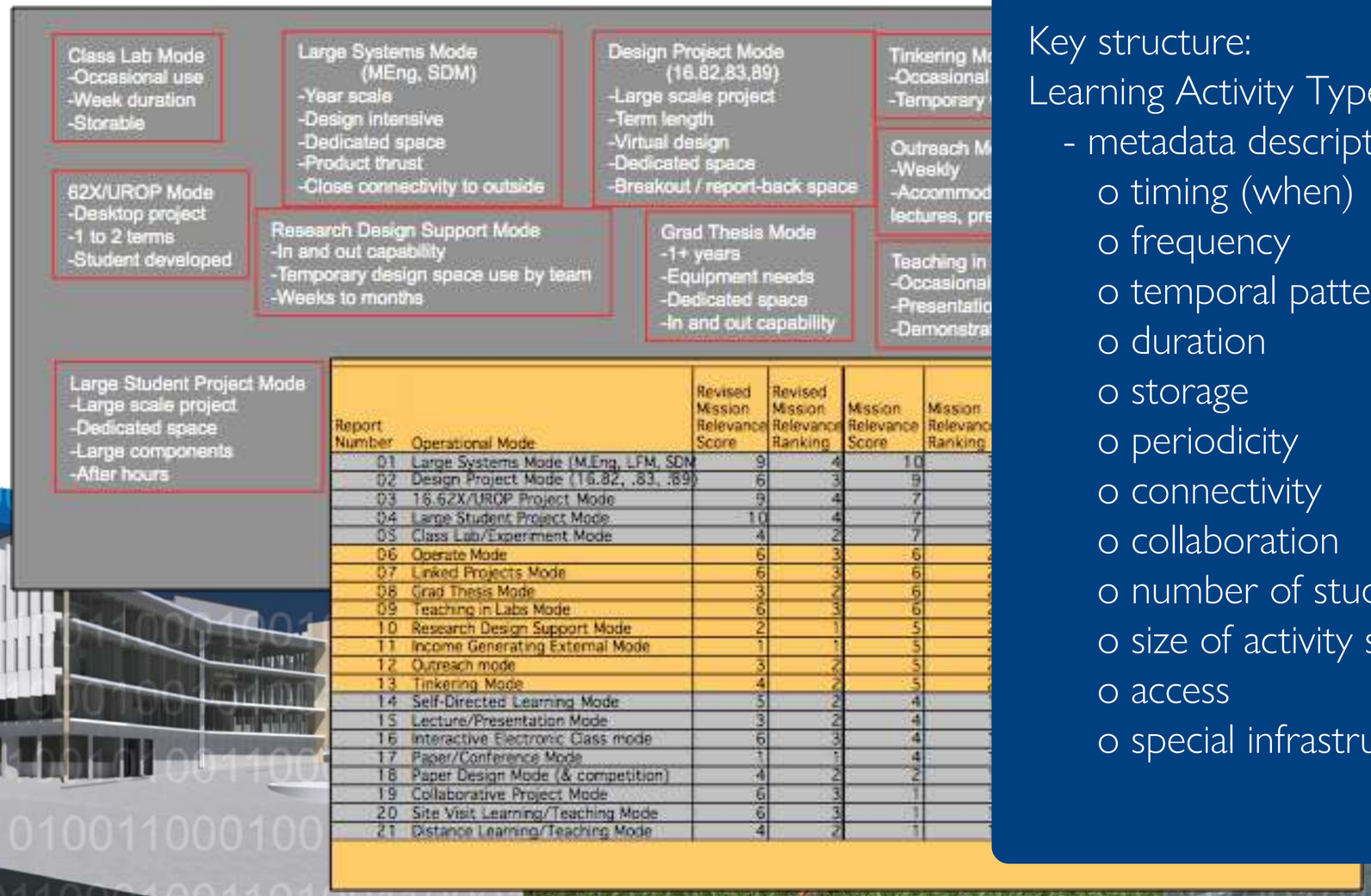
Teaching in Labs
-Occasional
-Presentation area
-Demonstrations



Courtesy of Ed Crawley, MIT

Learning Activities

ACTUAL MODAL SCORING



Report Number	Operational Mode	Revised Mission Relevance Score	Revised Mission Relevance Ranking	Mission Relevance Score	Mission Relevance Ranking
01	Large Systems Mode (M.Eng, LFM, SDM	9	4	10	
02	Design Project Mode (16.82, .83, .89)	6	3	9	
03	16.62X/UROP Project Mode	9	4	7	
04	Large Student Project Mode	10	4	7	
05	Class Lab/Experiment Mode	4	2	7	
06	Operate Mode	6	3	6	
07	Linked Projects Mode	6	3	6	
08	Grad Thesis Mode	3	2	6	
09	Teaching in Labs Mode	6	3	6	
10	Research Design Support Mode	2	1	5	
11	Income Generating External Mode	1	1	5	
12	Outreach mode	3	2	5	
13	Tinkering Mode	4	2	5	
14	Self-Directed Learning Mode	5	2	4	
15	Lecture/Presentation Mode	3	2	4	
16	Interactive Electronic Class mode	6	3	4	
17	Paper/Conference Mode	1	1	4	
18	Paper Design Mode (& competition)	4	2	2	
19	Collaborative Project Mode	6	3	1	
20	Site Visit Learning/Teaching Mode	6	3	1	
21	Distance Learning/Teaching Mode	4	2	1	

Key structure:
Learning Activity Type
- metadata descriptors
  - o timing (when)
  - o frequency
  - o temporal pattern
  - o duration
  - o storage
  - o periodicity
  - o connectivity
  - o collaboration
  - o number of students
  - o size of activity space
  - o access
  - o special infrastructure (gases, water, etc.)

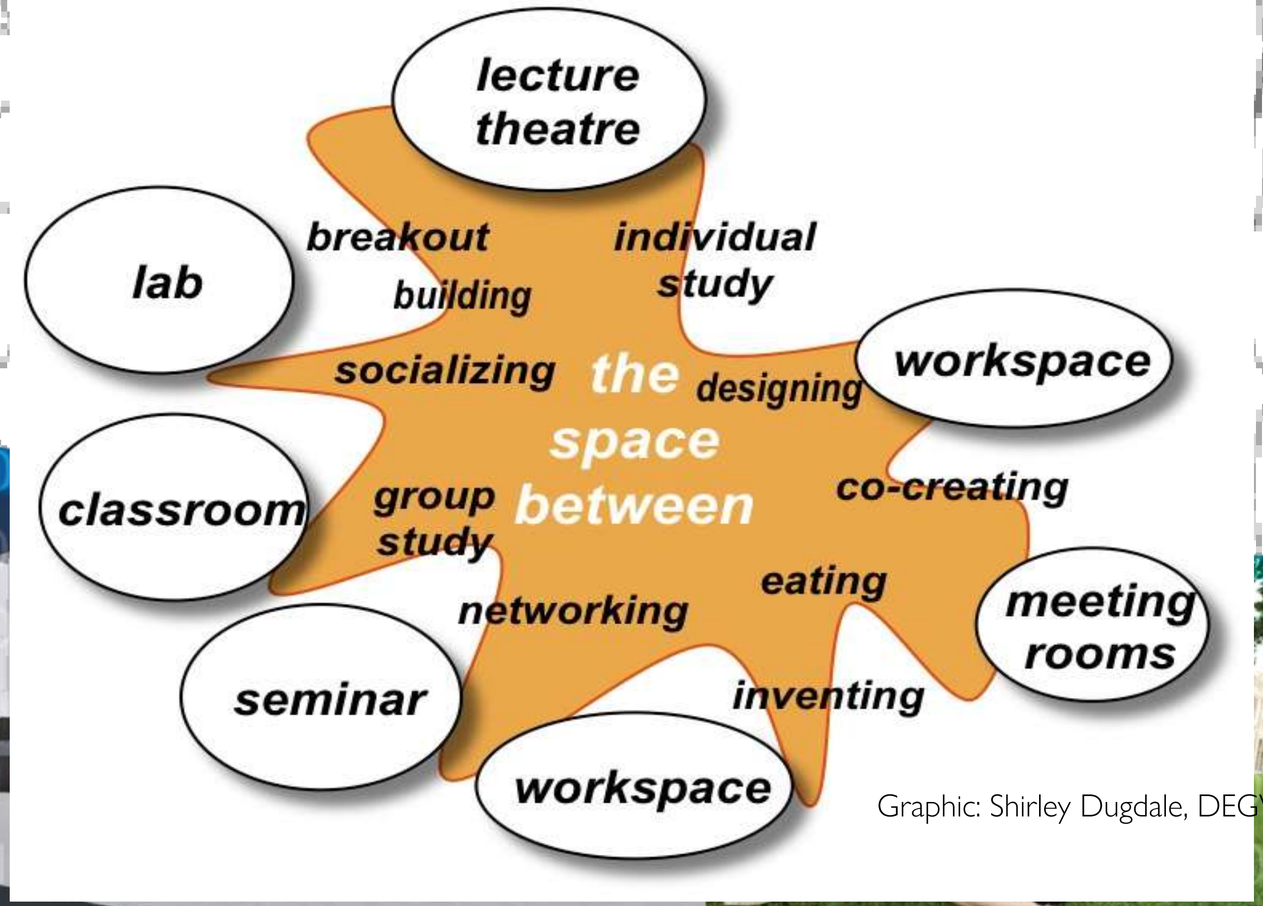
Nouns of Learning Spaces

Work surfaces -- Smartboards, whiteboards, tack boards, flip charts, blackboards Display outputs -- Flat panels, projectors, optiputers Mobile devices -- Tablet PCs, smartphones, laptops, iPods Audio channels -- Microphone, outputs Artifacts -- Inspirational objects, displays, posters Furnishings -- Tables, chairs, couches, partitions Capture / Re-use systems -- Lecture capture, LMS, personal podcasts, web Architectural elements -- Finishes, carpeting, room geometry, lighting configuration


VERBS of Learning Spaces

Connecting socially -- Peer-to-peer, faculty-to-student Discussing / Arguing -- Dyads, small group, "in the round" Commenting -- Anchored discussion, annotation from multiple sources Demonstrating Presenting / Demonstrating Searching -- ad hoc, across resources Capturing -- Faculty, student, group work (long-term, e-folios) Thinking/conceiving Debating/negotiating space

Prototyping & Tinkering



Graphic: Shirley Dugdale, DEGW

We know the entire campus is a learning environment, across space & time.

http://bigthink.com/ideas/38119

Prototyping & Tinkering

If buildings are ‘built pedagogy’, and inquiry & discovery are fundamental components of learning, how are these elements represented in the way we plan and make available spaces for learning on our campuses?

http://bigthink.com/ideas/38119

Thank You

Prof. Phillip D. Long, longpd@uq.edu.au
CEIT
The University of Queensland
&
Visiting Researcher, MIT