Questions to Ask

How does learning happen?
Learning is doing, not listening. Learning with trumps learning from.

—Woodie Flowers MIT

http://en.wikipedia.org/wiki/Woodi_Flowers
Eric Mazur: Nothing clarifies ideas better than explaining them to others.

- It's the middle of a class period and two hundred students aren't listening to the instructor. Instead, they're engaged in over fifty simultaneous conversations with their neighbors. This probably sounds like a disaster to many teachers. But it's actually a rousing success: the students are discussing a question which challenges them to think about the material and justify their reasoning to their classmates.
What is robust learning?

Robust learning is discovering, risking, able to be outside one’s comfort zone.
What is robust learning?

Robust learning is building bridges, preparing for what comes next.
What is robust learning?

Robust learning is carefully scaffolded learning.
What is robust learning? (messy)

Robust learning is practicing becoming
D-school --- Stanford University
Learning is enculturation into a practice—

The Atelier

--John Seeley Brown
What is robust learning?

Robust learning happens as students construct their own learning.
Questions to Ask

Why do spaces matter to learners, learning?
Spaces in which humans grow: a learning community... where mind and sensibility are shared... a place to learn together about the real world, and about possible worlds of the imagination, of materials and learn the power of doing these things together.

Questions to Ask

Where does learning happen?
Questions to Ask

Where does learning happen?
Where does learning happen?
Where does learning happen?

Learning can and does occur everywhere.

U Michigan: Art/architecture/engineering course (repurposed room in library/outside)
Where does learning happen?

Kennedy School--Harvard
Where does learning happen?

Hallway corner--MIT
Where does learning happen?
Team-based learning TBL classroom)—Duke University
Where does learning happen?
College of the Holy Cross
Where does learning happen?
Questions to Ask

How does planning happen?
How does planning happen?
How does planning happen?

Engaging leadership top-down, bottom up

I understand they’re going to connect them. The Provost ordered it.

From: “Facilitating interdisciplinary research,” National Academy of Sciences
How does planning happen?

Engaging leadership top-down, bottom up

- Sustained communication, talented and committed leadership
- Support for initial exploring (and sandboxing)
- An environment that encourages collaboration, supports risks
- A team philosophy
- Thinking of the end at the beginning.

Questions to Ask

What advances our planning?
What advances our planning?

Having fun, becoming a team of learners
What advances our planning?

Communal awareness of the power of language for shaping mental images

Change agents have a talent for speaking differently rather than for arguing well. ...to produce second order change...requires a strong alternative schema, presented clearly and persistently.

Karl E. Weick and Robert E. Quinn, Organizational Change and Development. Annu. Rev. Psychol. 1999.
What advances our planning?

Awareness of power of spaces as bridges to the future

U West Florida (2009)
What advances our planning?

A shared commitment: enhancing learning, institutional distinction into the future

“Thinking outside of the box is difficult for some people. Keep trying.”
What advances our planning?

A shared commitment to enhancing learning, institutional distinction into the future
What advances our planning?

A shared commitment: enhancing learning, institutional distinction into the future

Mitchel Resnick MIT
What informs our planning?
What informs our planning?

Attention to research findings

Carl Wieman, 2011

Major advances past 1-2 decades
Consistent picture $\Rightarrow$ Achieving learning

Science classroom studies

brain research

cognitive psychology

Like medicine $\sim$130 years ago--scientific approach led to dramatic improvements
What informs our planning?

Attention to research findings on what happens in spaces for learning

National Training Laboratories, 2000
What informs our planning?

Awareness of the reality of the changing roles of student & instructor

Chris Impey (University of Arizona)
What informs our planning?

Awareness of research on how your students learn (NSSE)

### Figure 13: Percentage of Seniors Whose Career Preparation Experience Highly Emphasized\(^a\) Selected Desirable Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing career-related skills</td>
<td>91%</td>
</tr>
<tr>
<td>Opportunities to work with others in meaningful activities</td>
<td>86%</td>
</tr>
<tr>
<td>Connecting academic and experiential learning</td>
<td>82%</td>
</tr>
<tr>
<td>Developing new ways of thinking</td>
<td>81%</td>
</tr>
<tr>
<td>Serious conversations with diverse people</td>
<td>64%</td>
</tr>
</tbody>
</table>

\(^a\)High emphasis reported as “Very much” or “Quite a bit”
What informs our planning?

Awareness of societal expectations: what learners are to become, be able to do.

We need a whole generation with the capacities for creative thinking and for thriving in a collaborative culture....People are not born with inherent innovation skills, but they can learn them. They can acquire the skills to work in diverse, multidisciplinary team, learn adaptability and leadership.

Council on Competitiveness, 2005
What informs our planning?

Awareness of societal goals for learning

(AAC&U LEAP)
What informs our planning?

Awareness of power of student-owned spaces

U West Florida (2009)
What informs our planning?

Awareness of spaces that are bridges to the future

U West Florida (2009)
What informs our planning?

Awareness of the power of student-owned spaces

UC Berkeley
What informs our planning?

Awareness of the power of student-owned spaces

Georgia Institute of Technology (Problem-driven learning rooms)
What informs our planning?

Awareness of the power of student-owned spaces

University of Minnesota (Active learning classrooms)
What informs our planning?

Awareness of the power of student-owned spaces

University of Pennsylvania Library
What informs our planning?

Awareness of the power of student-owned spaces

University of Pennsylvania Library
What informs our planning?

Awareness of the power of student-owned spaces at Grinnell
What informs our planning?

Awareness of the power of student-owned spaces

University of Sussex (?)
What informs our planning?

Awareness of the power of student-owned (planned?) spaces

Georgia Tech East Library pilot renovations
What informs our planning?

Awareness of how learning is imagined in our community

- I teach. You learn.
- Cultivating deep rows of disciplinary knowledge
What informs our planning?

Awareness of how all the users think about learning spaces—*students* (Agnes Scott College)
What informs our planning?

Awareness of the power of student-owned (planned?) spaces

Georgia Tech East Library pilot renovations
Questions to Ask

What is the language of learning spaces?
PBL Exercise Rooms

Learning happens when students are engaged in complex, collaborative problem solving, with time for taking risks, failing, and recovering.

Georgia Institute of Technology
The Studio

Learning happens when students have time for practicing and practicing, critiquing and playing.

Eastern Kentucky University
Noel Studio for Creativity
The Science Corner

Learning happens when students are socialized into a community of practice, into a community of learners.

Richland College (TX)
Learning happens when students have opportunities for multiple social networks, for changing and transforming roles, forms of participation, identities.

University of Maryland Baltimore County
• Digitorium

• Learning happens when students have access to spaces supporting social, affective, and cognitive aspects of learning.

• Northern Kentucky University
Questions to Ask

What are best practices and lessons learned from the field?
About best practices and lessons learned from the field

About sandboxing & lessons learned

UC Berkeley
About best practices and lessons learned from the field

About involving student learners

• “The new classroom space definitely has a better vibe than our old cramped classroom, at least giving me the illusion that I am able to learn better because I feel more ‘free’. Since more group work is possible, it turned me more into an active learner than a passive learner.”
The Process

Some spaces feel like prisons
Not enough space on campus for groups to work
All cafes on campus are hot spots.

Student Feedback

• Campus needs more informal learning spaces
• Prefer more flexibility that allows student/student & student faculty interaction
• Seamless use of and access to technologies
About best practices and lessons learned from the field

A deeper understanding of a process for reimagining, using, and assessing general-assignment (GA) classrooms.

Insights into the characteristics of desirable learning, reflecting perspectives of the broader Berkeley community.

How lessons learned in this reimagining process are shaping institutional policies and practices for shaping GA classrooms on our campus into the future.

UC Berkeley ‘Test Kitchen’
About best practices and lessons learned from the field

About documenting outcomes

UC Berkeley

• What works for us:

• Aesthetics or ambience (colors, natural light, etc.)
• Comfortable and flexible furniture
• Enough ‘space’ to easily move around the room
• Lighting options/scenes
• Wireless networking
• Plenty of infrastructure
• Up-to-date hardware, software & projection equipment
• Writing surfaces
• HVAC, creature comfort
• Maintenance & support
The Process

*Rooms without windows don’t work*

*Steeply sloped rooms a disaster*

*Need “Oprah-like” spaces*

Faculty Feedback

* Movable furniture for flexible use
* Support for faculty development for changing what and how they taught
* Need more informal spaces to accommodate different learning opportunities
The Process

Some spaces feel like prisons
Not enough space on campus for groups to work
All cafes on campus are hot spots.

Student Feedback

• Campus needs more informal learning spaces
• Prefer more flexibility that allows student/student & student faculty interaction
• Seamless use of and access to technologies
About best practices and lessons learned from the field

About linking faculty development to shaping and reshaping physical spaces
Questions to Ask

Where are some ‘aha' ideas?
Where are some ‘aha’ ideas?

About spaces at the cutting-edge
Where are some ‘aha’ ideas?

About spaces that challenge what we think about what knowledge is, changes…

University of Sussex (UK)
Moveable Curtain
Where are some ‘aha’ ideas?

About spaces agile enough to anticipate the future

Harvard University (Chemistry)
Where are some ‘aha’ ideas?

About spaces that can be used in different ways, at different times, by different users

West Point (Physics Lab)
Where are some ‘aha’ ideas

About spaces that can be used in different ways, at different times, by different users

University of Brighton—UK (Creativity Center)
Where are some ‘aha’ ideas?

About spaces that can be used in different ways, at different times, by different users

GT. East Commons Library
Where are some ‘aha’ ideas?

About spaces that have a metaphor: *Refreshment for mind and body.*
Where are some ‘aha’ ideas?

About first finding out what students want, see, feel, imagine

GT East Commons Focus Group Findings: Student want spaces that enable

- Aesthetics / comfort / refreshment
- Interleaving hard work with breaks
- Productivity tools for groups
- Celebrate GT creativity
- Fun / games
- Awareness / connectedness
- Morphs to my needs
- Thick, heterogeneous mix of options
East Commons Multimedia Studio
Where are some ‘aha’ ideas?

About how to think of every space as a learning space—most creatively and efficiently

Portland State University
Portland State University
University of Michigan
$E(x) = \mathbb{E}\{x\} = \sum_{i} x_i \cdot P(x_i) = \mathbb{E}\{x\} = \mu$

$\text{Var}(x) = \mathbb{E}\{(x - \mu)^2\} = (\mathbb{E}\{x^2\}) - (\mathbb{E}\{x\})^2 = \sigma^2$

$\text{Std Dev}(x) = \sqrt{\text{Var}(x)} = \sigma$
Questions to Ask

What are key opportunities for the future?
Greening the program and place

Fourth Floor Study Room

Inspired by the living walls at Longwood Gardens and the University of Delaware’s Philadelphia Flower Show exhibit, green walls provide many benefits to the study environment. Green walls are living works of art that help reduce stress and enhance wellbeing. They benefit the building in that they purify air thus increasing the air quality, cut cooling cost by up to twenty percent, and dampen noise pollution. Although more costly than potted plants, green walls pay off in the long run with little to no maintenance. The versa wall tray system by Gsky Plant Systems holds industry standard 4”-4.5” pots and waters the plants without dripping water out the front of the system. Perfect for areas with seating in front of the wall, tight areas without room for a drip pan. This system is very easy to maintain and can be installed without a direct water connection to the wall. It also features 100% water efficiency, meaning there is zero water waste when used with the Gsky recirculation option making GVersa the most environmentally friendly Green Wall system on the market.
Capitalizing on 21st century technologies for sharing and analyzing data
Capitalizing on 21st century technologies for connecting and collaborating
Techo ‘café’ University of Durham (UK)
Deconstructing boundaries
Maker spaces -- University of Michigan
Ensuring the success of all students