Trends in Higher Education

September 2012

Collaborative learning spaces
Fewer lectures – More seminars
On-line and blended course options
Changing functionality of existing spaces
Team-based rooms for new pedagogy
Concurrently scheduled rooms – lecture/lab
New types of student study spaces
Ability to accommodate increased enrollments
How we teach – How we learn
Content

Pedagogy

Technology

Place
Content

Pedagogy
Team-based discovery and activities sharpen communication, critical thinking and problem solving skills

Traditional lectures, although excellent for many purposes, do not convey concepts well because of their passive nature.

~ John Belcher, MIT Physics Faculty; TEAL Project

Active learning spaces offer informal facilitation, peer-to-peer interaction and instruction, multi-platform technology, and application of concepts through activity.

~ Paulien & Associates, Inc.
Social Learning Ecosystem

Created and Guided by Faculty

Guided Competency Development – Formal Learning

Guided Contextual Learning – Experiential Learning

Competency-Based Learning

Social Competency Development – Mentoring

Social Contextual Learning – Peer-to-Peer Learning

Context-Based Learning

Created and Guided by Students

Meister & Willyerd, The 2020 Workplace, 2010
Competency-Based Education

- **Mastery is the sole determinant of progress**
  - Outcome-based approach to education
  - Emphasis is on what graduates know and can do
  - Identify competencies
  - Students advance when they have demonstrated mastery of a competency

- **Delivery options multiply and expand since any instructional method or instructional provider that can move a student toward mastery is theoretically acceptable.**
Universal Design for Learning

**Give Students:**

- Multiple means of **representation** to give learners various ways of acquiring information and knowledge.
- Multiple means of **expression** to provide learners alternatives for demonstrating what they know.
- Multiple means of **engagement** to tap into learners’ interests, challenge them appropriately, and motivate them to learn.

**Focus on:**

- Instructional Goals
- Methods
- Materials
- Assessments

Center for Applied Special Technology (CAST) 1990
Pedagogy

**Traditional Pedagogy**
- Teacher-centered instruction
- Single sense stimulation
- Single path progression
- Single media
- Isolated work
- Information delivery
- Passive learning
- Factual, knowledge-based
- Literal thinking
- Reactive response
- Isolated, artificial content

**Contemporary Pedagogy**
- Student-centered instruction
- Multi-sensory stimulation
- Multi-path progression
- Multimedia
- Collaborative work
- Student-centered activities
- Active/exploratory
- Information exchange
- Inquiry-based learning
- Proactive/planned action
- Authentic, real-world content

Inquiry learning
Mastery learning
Hands-on learning
Problem-based learning

*Increase student engagement and performance*
Contemporary Pedagogy

**Structural Aspects**
- Flexible spaces
- Spaces with visible infrastructure
- Adaptable space
- Layered spaces
- Space with durable building materials and finishes
- Space with core or fixed elements

**Group Size**
- Variable size space
- Individual workspace
- Faculty team spaces

**Psychological/Physiological Support**
- Spaces that provide sense of belonging, ownership, and pride
- Spaces with access to food and beverage
- "Get away" spaces
- Zoned spaces
- Caves
- Natural light
- Spaces for transportation support

**Functional Spaces**
- Focus lab spaces
- Classroom spaces
- Presentation spaces
- Practice spaces
- Process galleries, studios & display spaces
- Project space
- Home base
- Informal learning space
- Collaboration incubator

**Furnishings**
- Spaces with versatile furnishings
- Display spaces
- Space with variable lighting

**Adjacencies**
- Access to community
- Adjacent and nested spaces
- Visibility
- Connections among people and spaces
- Resource, supply and storage spaces
- Space and furnishings technology
Discussion
Content

Technology
Technology: The Conversation Prism

Today’s Student:
• Connected, active, social and visual learners
• Have constant access to visual, multi-sensory technology
• Value the on-grounds, campus experience
• Prefer authentic experiences
• Are global thinkers
• Blend their social and academic lives

Brian Solis, Social Media Brandsphere
Video Content

MIT, Harvard, UC Berkeley
## Biology Offerings

Covers topics seen in a first year college or high school biology course.

### Biology Offerings

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Instructor(s)</th>
<th>Start Date</th>
<th>Duration</th>
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<tbody>
<tr>
<td>Biophysics: A Quantitative Approach</td>
<td>Roger Colle Berly</td>
<td>Sep 24th 2012</td>
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<td>Drugs and the Brain</td>
<td>Harry A. Lester</td>
<td>November 2012</td>
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<td>Introductory Human Physiology</td>
<td>Emma Johni, Jennifer Carbony</td>
<td>Jan 23rd 2013</td>
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<td>Astronomy and the Search for Extraterrestrial Life</td>
<td>Charlie Cokell</td>
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<td>Critical Thinking in Global Challenges</td>
<td>Celine Cappelle, Mayork Duto</td>
<td>Jan 26th 2013</td>
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<td>Medical Neuroscience</td>
<td>Leonard E. White</td>
<td>Mar 25th 2013</td>
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<td>Computational Neuroscience</td>
<td>Nathan Ross, Adrienne Kocholl</td>
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<td>Basic Behavioral Neurology</td>
<td>Roy Griswold, MD</td>
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<td>Introduction to Genetics and Evolution</td>
<td>Mohamed Noor</td>
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<td>Evolution Biology</td>
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<td>A Manual of Online Molecular Biology Techniques</td>
<td>Course Details</td>
<td>University of Cape Town</td>
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<td>21A.265, The Anthropology of Biology (MIT)</td>
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<td>7.84J Topics in Computational and Systems Biology (MIT)</td>
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<td>ICT Integration in Biology</td>
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Open Courseware

Biology Offerings
Process Oriented Guided Inquiry Learning

- Originated in college chemistry departments in 1994
- Guided inquiry approach
- Student-centered, self-managed strategy
- Small groups with individual roles
- Fully engaged in the learning process
- Classroom or lab consists of students working in small groups on specially designed guided inquiry materials
- Materials supply students with data or info followed by leading questions designed to guide them toward formulation of valid conclusions
- Recapitulation of the scientific method

http://www.pogil.org/about/straumanis-ted-talk
SpongeLab

A GLOBAL SCIENCE COMMUNITY

Professional Development License

What's New

Explore

Featured Content

Spongelab Marketplace

Search science topics, lesson plans, case studies and more
INTERACTIVE PLASMA DISPLAYS
These devices permit users to view content, manipulate it, and save it for a future discussion. At any time, the contents on display can be printed or saved to an electronic file.

CONTENT SHARING SYSTEMS
These software / hardware solutions permit multiple users to alter the contents of the display mounted at the front of the classroom.

AUDIENCE RESPONSE SYSTEMS
This tool permits students to answer questions electronically and to have the results compiled immediately.

MULTIPLE DISPLAYS
LCDs or screens with high definition projection throughout the space support multiple fronts of room.
On-line/Hybrid/Blended Education

What if the role of the classroom is diminished and education comes to the student?

Chart 1 - Annual Growth Rates for Online Enrollments

Chart 2 - Is Online Education Critical to the Long-term Strategy of your Institution?
Technology

- **Mobile devices**
  - Social networking -> learning together
  - Mobile web platforms (D2L)

- **Open resources**
  - Free on-line content
  - State of the art conferencing education (MOOCs)

- **Online classroom content**
  - High production value
  - Interactive digital discussions
  - Live broadcasts
  - Recorded video

- **E-books**
  - Digital text books for on-demand rental
  - Digital content: text, graphics, imagery

- **Analytics for measurement**

- **Cloud support**
  - Justify with quickly depreciating equipment
Discussion

Technology
Content
Place: EVC Classrooms
Innovative Classrooms

Present Model
Specialized
Formal
Structured
Physical
Individual

Emerging Model
Multipurpose
Informal
Flexible
Virtual
Team

S. Dugdale, A Case Study in Master Planning the Learning Landscape
Assignable Square Feet/Student Station is a unit of space that is assigned to a single station in a designated space.
Changing student station configurations without changing the number of stations, also yields support of different pedagogies.

Classroom Configurations

Tablet Armchair
60 Stations
22 ASF/Station

Tables & Chairs
60 Stations
22 ASF/Station

Active Learning
60 Stations
22 ASF/Station
Active Learning Spaces: Today’s College Student

• Always on, connected to be active, social and visual learners
• Expect full and immediate access to media and information
• Create and consume large amounts of information
• Visual, multi-sensory technology use is constant
• Connect living & learning
• Value the on-grounds, campus experience
• Consumer-oriented but expect everything to be online
• Want to use technology to express creativity
• Want technology for collaboration
• Prefer authentic experiences
• Global thinkers, what to connect globally
• Blend their social and academic lives
Active Learning Spaces: Large Group

**Group-based Model**

- Over 100 students
- 25 - 30 ASF/Station
- Highly collaborative, hands-on, computer-rich, interactive learning environment for large-enrollment courses (NCSU SCALE UP)
- Instructors move throughout room during lecture as a “guide on the side” with voice amplification
- Learning shifts to the students as educators
- Faculty members introduce a problem and students work in small groups and independently to complete assignment
- Lecture, recitation, and hands-on experiments are in one space
Active Learning Spaces: Small Group

**Team-based Model**
- 25 – 30 students
- 30 – 35 ASF/Station
- Front-of-room and group discussion
- Lightweight and ergonomic furnishings
- Large screen displays
- Whiteboard surfaces
- Sufficient electrical outlets

**Project-based Model**
- 25 – 30 students
- 30 – 35 ASF/Station
- Front-of-room and group discussion
- Lightweight and ergonomic furnishings
- Large screen displays
- Whiteboard surfaces
- Sufficient electrical outlets
- Learn as individuals & as teams
- Small groups are used to master content
- Faculty members introduce a problem and students work in small groups and independently to complete assignment
Active Learning Spaces: Small Group
The Flipped Model IS:

A means to INCREASE interaction and personalized contact time between students and teachers.
- An environment where students take responsibility for their own learning.
- A classroom where the teacher is not the "sage on the stage", but the "guide on the side".
- A blending of direct instruction with constructivist learning.
- An opportunity to better manage timing of practice and reinforcement.
- A class where content is permanently archived for review or remediation.
- A class where all students are engaged in their learning.
- A place where all students can get a personalized education.
- Supports an institution’s educational goals, program, structure and course content.

The Flipped Model is NOT:

- A synonym for online videos. When most people hear about the flipped class all they think about are the videos. It is the interaction and the meaningful learning activities that occur during the face-to-face time that is most important.
- About replacing teachers with videos.
- An online course.
- Students working without structure.
- Students spending the entire class staring at a computer screen.
- Students working in isolation.

“What is the best use of my face-to-face time?”
Discussion

Classrooms
Labs: Flexibility

- Design to accommodate change - be generic not specific
- Consider use of space and selection of lab fit-out (e.g. using furniture which can be reassembled)
- Consider how equipment, bench space and workstation can be integrated
- Consider porous, shared, interstitial spaces
- Consider interdisciplinary lab support rooms

Victoria Bolton, Education, 2010
Team-Based Discovery

- Constructivist learning
- Provide space for teams to work together and support information access with IT services
- Give teams multiple places to meet, including virtually
Shared Resources

- Minimize space and equipment that can only be used by one subject
- Consider site specific rather than subject specific and consider sharing within discipline
- Science on display
Sustainability

- Fume Cupboard – use efficient hoods & educate users about electricity cost
- HVAC – optimize ventilation rates and design low pressure drop HVAC design
- Electrical – design appropriate plug loads; use lights that have sensors to turn off when lab is unoccupied
- Natural Daylight – bring into labs (where appropriate) for reduced energy use and occupant productivity
- Energy Efficiency – consider natural convection of fresh filtered air
- Maximize Energy Recovery
- Water efficiency - use recycled where appropriate and low-flow
Case Study

_Pikes Peak Community College_
- Rampart Center
- Science wing

_Challenge_
- Design shared spaces integral to both classrooms and laboratories

_Design_
- Corridor entrance to interstitial space between classrooms and laboratories allow instructors universal access to materials, supplies, and prep area for student instruction
- Creates interdisciplinary lab support space
Collaborative Learning Spaces

What do these collaborative spaces have in common?

- Small group discussion areas
- Technology supporting stations and multiple fronts-of-room
- Comfortable, informal seating
- Multiple vertical & horizontal surfaces
- Porous work areas
- Visible & transparent for observation & safety
- Sufficient electrical outlets
Collaborative Learning Spaces
Discussion
Office Trends

**Traditional Office**
- Single resident in closed room
- Goal of large, corner office
- Privacy
- Pictures and plants
- Designated seating
- Designated file storage
- Hard wired to internet

**Shared Office**
- Dual residents in closed room
- Private office is goal
- Some privacy
- Pictures and plants
- Designated/shared seating
- Designated file storage
- Hard wired to internet
Office Trends

**Adjunct Offices**
- Shared offices
- Separate room for private conversation
- Shared workroom equipment
- Visitor seating
- Shared file storage
- Hard-wired / wireless connectivity

**Office Design Trends**
- Shared collaborative and team-oriented space
- Smaller but smarter
- “Hotelering” within private enclaves
- Privacy rooms for ad-hoc conversations
- Electronic personal items: wallpaper & savers
- Informal seating
- Culture parks
- Ubiquitous electronic storage
- Wireless connectivity
Discussion
Student life has transitioned from traditional social and recreational activities to the inclusion of academic nodes.
Student Life
Student Life
Place
Place
Virtual Education

Indiana University
- Art philosophy class
- Students create avatars and move their avatars through a virtual classroom
- Professor combines with video chats, email and Facebook to meet academic needs

Georgia Tech
- Hosts STEM students with sensory or physical limitations in Second Life
- Meets the needs of those hampered by specific cognitive processing issues
- Avatars can reflect disability (wheelchair, guide dog, etc.) or have nothing to do with their disability
- Pair students with mentors chosen to meet their needs

Learning Experience Systems

![Image of a virtual classroom and avatars]
Space Allocation Process

- Programs and Pedagogy
- Partnerships & Student Demographics
- Academic Support
- Technology and Delivery
- Faculty and Staff

Space Allocation Planning

Classrooms & Academic Commons
Collaborative Learning Areas
Teaching & Open Laboratories
Faculty & Staff Offices
Community Areas
Student Areas
Thank You