Moving from Effective Teaching to the Scholarship of Teaching and Learning (SoTL)

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Michigan State University
Lilly Teaching Workshop
September 22, 2011

Workshop Layout

• Welcome & Overview
• Background
  – Designing effective learning environments
  – Boyer – Scholarship Reconsidered
  – Hutchings & Shulman – Levels of Inquiry
• Scholarship of Teaching and Learning (SoTL)
  – Definition
  – Participant Survey
  – Rationale
  – Resources
  – Practice
• Advancing Along the Levels of Inquiry – Suggestions and Strategies
• Summary and Next Steps
Workshop Objectives

• Participants will be able to
  – Describe innovation cycle of educational practice and research and its role in designing effective learning environments
  – Describe key features of SoTL and how it differs from Scholarly Teaching and Discipline-Based Education Research
  – Explain rationale for SoTL
  – Identify SoTL opportunities in courses and programs
  – Locate SoTL resources

It could well be that faculty members of the twenty-first century college or university will find it necessary to set aside their roles as teachers and instead become designers of learning experiences, processes, and environments.

James Duderstadt, 1999 [Nuclear Engineering Professor; Dean, Provost and President of the University of Michigan]
…objectives for engineering practice, research, and education:

To adopt a systemic, research-based approach to innovation and continuous improvement of engineering education, recognizing the importance of diverse approaches—albeit characterized by quality and rigor—to serve the highly diverse technology needs of our society.


Celebration of Two Major ASEE Milestones

2011 ASEE Annual Conference and Exposition
Vancouver, British Columbia · Monday, June 27, 2011
One BIG Idea; Two Perspectives

Engineering Education Innovation

ASEE Main Plenary, 8:45 a.m. – 10:15 a.m.
Vancouver International Conference Centre, West Ballroom CD

Expected to draw over 3,000 attendees, this year’s plenary features Karl A. Smith, Cooperative Learning Professor of Engineering Education at Purdue University and Morse-Alumni Distinguished Teaching Professor & Professor of Civil Engineering at the University of Minnesota.

Smith has been at the University of Minnesota since 1972 and has been active in ASEE since he became a member in 1973. For the past five years, he has been helping start the engineering education Ph.D. program at Purdue University. He is a Fellow of the American Society for Engineering Education and past Chair of the Educational Research and Methods Division. He has worked with thousands of faculty all over the world on pedagogies of engagement, especially cooperative learning, problem-based learning, and constructive controversy.

On the occasion of the 100th anniversary of the Journal of Engineering Education and the release of ASEE’s Phase II report Creating a Culture for Scholarly and Systematic Innovation in Engineering Education (Jamieson/Lohmann report), the plenary will celebrate these milestones and demonstrate rich, mutual interdependences between practice and inquiry into teaching and learning in engineering education. Depth and range of the plenary will energize the audience and reflect the interests of conference participants. One of ASEE’s premier educators and researchers, Smith will draw upon our roots in scholarship to set the stage and weave the transitions for six highlighted topics selected for their broad appeal across established, evolving, and emerging practices in engineering education.

Highlights from Monday:

Video: https://secure.vimeo.com/27147996
Slides: http://www.ce.umn.edu/~smith/links.html
http://www.asee.org/conferences-and-events/conferences/annual-conference/2011/program-schedule/conference-highlights
SoTL Interests

• Describe your interest in SoTL and what you’d like to get out of the workshop.
• Individually identify a few interests and goals – Please record them
• Report to the group
  • Short Exercise ---- 4 min
    – Think individually --------- ~1 min
    – Discuss in your group ---- ~ 2 min
    – Select a few ideas to share with virtual group ---- ~1 min

Scholarship Reconsidered: Priorities of the Professoriate Ernest L. Boyer

• The Scholarship of Discovery, research that increases the storehouse of new knowledge within the disciplines;

• The Scholarship of Integration, including efforts by faculty to explore the connectedness of knowledge within and across disciplines, and thereby bring new insights to original research;

• The Scholarship of Application, which leads faculty to explore how knowledge can be applied to consequential problems in service to the community and society; and

• The Scholarship of Teaching, which views teaching not as a routine task, but as perhaps the highest form of scholarly enterprise, involving the constant interplay of teaching and learning.

## Levels of Education Inquiry

<table>
<thead>
<tr>
<th>Level 0 Teacher</th>
<th>Level 1 Effective Teacher</th>
<th>Level 2 Scholarly Teacher</th>
<th>Level 3 Scholarship of Teaching and Learning</th>
<th>Level 4 Discipline Based Education Researcher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teach as taught</td>
<td>Teach using accepted teaching theories and practices</td>
<td>Assesses performance and makes improvements</td>
<td>Engages in educational experimentation, shares results</td>
<td>Conducts educational research, publishes archival papers</td>
</tr>
</tbody>
</table>


## Levels of Inquiry

- **Level 1: Excellent teaching**
  - Involves the use of good content and teaching and assessing methods
- **Level 2: Scholarly Teaching**
  - Involves good content and methods *and* classroom assessment and evidence gathering, informed by best practice and best knowledge, inviting of collaboration and review.
Levels of Inquiry (cont’d)

• Level 3: Scholarship of Teaching and Learning
  – The Instructor (a) Is aware of modern pedagogical developments and incorporates them in his/her teaching where appropriate, and (b) Reflects on, assesses, and attempts to improve his/her teaching (classroom research)
  – Is public and open to critique and evaluation, is in a form that others can build on, involves question-asking, inquiry and investigation, particularly about student learning.

SoTL Experience

• Individually: Reflect on SoTL Activities
  – Subscribe to teaching journals?
  – Read/skim teaching journals?
  – Attended teaching conferences/workshops?
  – Published articles on teaching & learning?
  – Other activity in scholarship of teaching and learning?
    • Attended a teaching effectiveness workshop
    • Introduced new teaching strategy and/or content and assessed for improvement of learning

• Discuss in Groups of 3-4
  – Share SoTL experiences/activities

• Prepare 2-3 stories to share with the larger group
Why should we care about SoTL?

One Reason - Calls for evidence-based promising practices

Student Engagement Research Evidence

• Perhaps the strongest conclusion that can be made is the least surprising. Simply put, the greater the student’s involvement or engagement in academic work or in the academic experience of college, the greater his or her level of knowledge acquisition and general cognitive development …(Pascarella and Terenzini, 2005).

• Active and collaborative instruction coupled with various means to encourage student engagement invariably lead to better student learning outcomes irrespective of academic discipline (Kuh et al., 2005, 2007).

Cooperative Learning Research Support

- Over 300 Experimental Studies
- First study conducted in 1924
- High Generalizability
- Multiple Outcomes

**Outcomes**
1. Achievement and retention
2. Critical thinking and higher-level reasoning
3. Differentiated views of others
4. Accurate understanding of others’ perspectives
5. Liking for classmates and teacher
6. Liking for subject areas
7. Teamwork skills

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Book Ends on a Class Session

Strategies for Energizing Large Classes: From Small Groups to Learning Communities:

Jean MacGregor, James Cooper, Karl Smith, Pamela Robinson

New Directions for Teaching and Learning, No. 81, 2000.
Jossey- Bass


Problem-Based Cooperative Learning

At M.I.T., Large Lectures Are Going the Way of the Blackboard

http://web.mit.edu/edtech/casestudies/teal.html#video

http://www.ncsu.edu/PER/scaleup.html

http://www.youtube.com/watch?v=lfT_hoiuY8w

http://www.udel.edu/pbl/

PROBLEM-BASED LEARNING

UD PBL articles and books
UD PBL in the news
Sample PBL problems
UD PBL courses and syllabi
PBL Clearinghouse
PBL Conferences and Other PBL sites
Institute for Transforming Undergraduate Education
Other related UD sites

"How can I get my students to think?" is a question asked by many faculty, regardless of their disciplines. Problem-based learning (PBL) is an instructional method that challenges students to "learn to learn," working cooperatively in groups to seek solutions to real-world problems. These problems are used to engage students’ curiosity and initiate learning the subject matter. PBL prepares students to think critically and analytically, and to find and use appropriate learning resources. — Barbara Dunkle

PBL 2002:
A Pathway to Better Learning
Recipient of 1999 Hechangel Certificate of Excellence

Recipient of 1999 Hechangel Certificate of Excellence

http://www.udel.edu/pbl/
### Cooperative Learning Adopted

The American College Teacher: National Norms for 2007-2008

<table>
<thead>
<tr>
<th>Methods Used in “All” or “Most”</th>
<th>All – 2005</th>
<th>All – 2008</th>
<th>Assistant - 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperative Learning</td>
<td>48</td>
<td>59</td>
<td>66</td>
</tr>
<tr>
<td>Group Projects</td>
<td>33</td>
<td>36</td>
<td>61</td>
</tr>
<tr>
<td>Grading on a curve</td>
<td>19</td>
<td>17</td>
<td>14</td>
</tr>
<tr>
<td>Term/research papers</td>
<td>35</td>
<td>44</td>
<td>47</td>
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</tbody>
</table>

http://www.heri.ucla.edu/index.php

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### Why do SoTL?

- ?
Why do SoTL?

- Fosters significant, long-lasting learning for all students
- Enhances practice and profession of teaching
- Brings faculty’s work as teachers into the scholarly realm.
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Basic Features of Professional and Scholarly Work

• It requires a high level of discipline-related expertise
• It is conducted in a scholarly manner with clear goals, adequate preparation, and appropriate methodology
• The work and its results are appropriately and effectively documented and disseminated. This reporting should include a reflective critique that addresses the significance of the work, the process that was used, and what was learned.
  • It has significance beyond the individual context.
  • It breaks new ground or is innovative.
  • It can be replicated or elaborated on.
  • The work both process and product or result is reviewed and judged to be meritorious and significant by a panel of ones peers.


The Scholarship of Teaching and Learning Reconsidered: Institutional Integration and Impact

Publisher: San Francisco: Jossey-Bass
Publication Author: P.H. Huling, Mary Taylor Huber, Anthony Alphonso

Abstract: Drawing on the experience with the individuals, campuses, and professional associations associated with the Carnegie Academy for the Scholarship of Teaching and Learning, the Institutional Integration Program, this report is a resource for institutional leaders engaged with the scholarship of teaching and learning, or seeking ways to support faculty engaged in scholarship of teaching and learning. The report focuses on successful examples of support for the scholarship of teaching and learning and people in foundations and other education associations with an interest in supporting new initiatives in teaching and learning.

Series:
SOTL Publications

Additional Resources:
- Download the full report (PDF)
- Download chapter one, "Why the Scholarship of Teaching and Learning Matters Today" (PDF)


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http://fod.msu.edu/sotlsymposium/about.asp

http://academics.georgiasouthern.edu/ijsotlconference/2011/
Faculty involved in SoTL “frame and systematically investigate questions related to student learning—the conditions under which it occurs, what it looks like, how to deepen it, etc. and do so with an eye not only to improving their own classrooms but also to advancing practice beyond it.” What differentiates SoTL from the ongoing self-assessment of our own teaching is that it is “public, peer-reviewed and critiqued, and exchanged with other members of our professional communities.”

Pat Hutchings and Lee Shulman of the Carnegie Foundation
## SoTL Practice

- **Select a Setting (~3 minute videos)**
  - Physics – Harvard – Teaching through questioning
  - Physics – MIT – Studio physics
  - Biology – UMN – SCALE-UP

- **Instructor emphasis (student learning outcomes):**
  - Conceptual understanding
  - Systematic problem formulation and solving

- **Watch video with viewing partner (faculty focus & student focus)**
  - Identify potential questions for SoTL study

## Video Examples

- **Mazur – From Questions to Concepts – Physics**
  - Harvard
  - [http://www.youtube.com/watch?v=lBYrKPoVFwg](http://www.youtube.com/watch?v=lBYrKPoVFwg)

- **Belcher – Technology Enabled Active Learning**
  - Physics – MIT
  - [http://web.mit.edu/edtech/casestudies/teal.html#video](http://web.mit.edu/edtech/casestudies/teal.html#video)

- **Wright – Inside Active Learning Classrooms – Biology**
  - University of Minnesota
  - [http://www.youtube.com/watch?v=lfT_hoiuY8w](http://www.youtube.com/watch?v=lfT_hoiuY8w)
Types of Questions

- Instructional Knowledge—components of instructional design
- Pedagogical Knowledge—student learning & how to facilitate it
- Curricular Knowledge—goals, purposes & rationales for courses or programs

3 types of reflection within each form of knowledge

- Content—What should I do…
- Process—How did I do…
- Premise—Why does it matter…
Examples for process reflection:

How did I (we) do at:

• Course design, methods & assessing effectively? (instructional)
• Facilitating student knowledge? Was I successful? (pedagogical)
• Arriving at goals & rationale for courses? (curricular)

SoTL Futures

• Reflection Questions:
  – Are you interested in developing a SoTL project? Why-why not?
  – If yes, what question(s) would you explore?
  – What organizational resources and or support is available?
  – What organizational challenges do you face?
  – Thoughts on helping prepare the next generation of faculty for SoTL work?
• Discuss in Groups of 3-4
  – Share responses
• Prepare 2-3 responses to share with the larger group
Workshop Resources

• Handouts

• Websites
  – Carnegie Academy for the Scholarship of Teaching and Learning (CASTL) - http://www.carnegiefoundation.org/scholarship-teaching-learning
  – Collaboratory for Engineering Education Research - cleerhub.org

• Books
Guiding principles for scientific research in education

1. Pose **significant questions** that can be investigated **empirically**
2. Link research to relevant **theory**
3. Use **methods** that permit **direct investigation** of the question
4. Provide coherent, explicit chain of **reasoning**
5. Replicate and **generalize** across studies
6. Disclose research to encourage professional **scrutiny and critique**

**Source**: Scientific Research in Education, National Research Council, 2002

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**Workshop Resources**

Workshop Resources

• Additional
  – Center for the Advancement of Scholarship on Engineering Education; http://www.nae.edu/nae/caseecomnew.nsf

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Thanks for your participation!

• To download a copy of the presentation - go to:  
  http://www.ce.umn.edu/~smith/links.html

• Please complete the assessment