

Advancing the Levels of Inquiry in Teaching and Learning: Considerations in Moving from Effective Teacher to the Scholarship of Teaching and Learning (SoTL)

Karl A. Smith

Engineering Education – Purdue University
Civil Engineering - University of Minnesota
ksmith@umn.edu - <http://www.ce.umn.edu/~smith/>

**National Science Foundation
Webinar
Enrichment Workshop
2011**

Workshop Layout

- Welcome & Overview
- Background
 - Duderstadt, Jamieson & Lohmann – 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 Engineering Education Research
 - Explain rationale for SoTL
 - Identify SoTL opportunities in courses and programs
 - Locate SoTL resources

Preliminary Comments

Active & Collaborative Learning

- **Effective learning activities**
 - Recall prior knowledge – actively, explicitly
 - Connect new concepts to existing ones
 - Challenge and alter misconceptions
 - Reflect on new knowledge
- **Active & collaborative processes**
 - **Think** individually
 - **Share** with partner
 - **Report** to local and virtual groups
 - **Learn** from program directors' responses

Participant Activities

- **Long Exercise** ---- 6 min
 - Think individually ----- ~2 min
 - Share with a partner ----- ~2 min
 - Report in local group ---- ~2 min
- **Short Exercise** ----- 4 min
 - Think individually ----- ~2 min
 - Report in local group ---- ~2 min
- **Individual Exercise** ----- 2 min

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Facilitator's Duties

- **Coordinate the local activities**
- **Watch the time**
 - **Allow for think, share, and report phases**
 - **Reconvene on time -- 1 min warning slide**
- **Ensure the individual think phase is devoted to thinking and not talking**
- **Coordinate the comments and questions by local participants**

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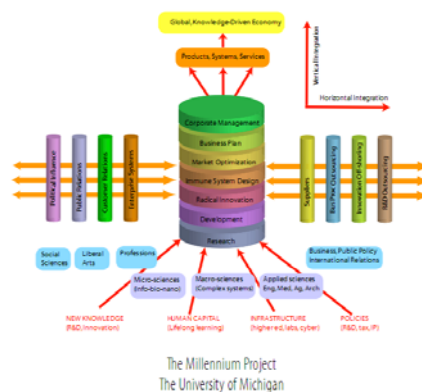
It could well be that faculty members of the twenty-first century college or university will find it necessary to set aside their roles as teachers and instead become **designers** of learning experiences, processes, and environments.

James Duderstadt, 1999 [Nuclear Engineering Professor; Dean, Provost and President of the University of Michigan]



Engineering for a Changing World

A Roadmap to the Future of
Engineering Practice, Research, and Education



...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

<http://milproj.ummu.umich.edu/publications/EngFlex%20report/download/EngFlex%20Report.pdf>

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American Society for Engineering Education

The Innovation Cycle of Educational Practice and Research

```

graph TD
    EP[Educational Practice] -- "which help improve" --> AI[Answers Insights]
    AI -- "that results in" --> ER[Educational Research]
    ER -- "which lead to" --> QI[Questions Ideas]
    QI -- "identifies and motivates" --> EP
  
```

Adapted from Booth, Colomb, and Williams, 2008

Engineering education innovation is about designing effective learning environments. It requires, at the least, engineering and education expertise working in continual cycles of educational practice and research.

Innovation Cycle of Educational Practice and Research (Jamieson/Lohmann, 2009)

Jamieson, L.H. & Lohmann, J.L. 2009. Creating a Culture for Scholarly and Systematic Innovation in Engineering Education. ASEE. <http://www.asee.org/about-us/the-organization/advisory-committees/CCSSIE>

Activity 1

SoTL Interests/Webinar Goals

- **Describe your interest in SoTL and what you'd like to get out of the webinar.**
- **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

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ONE Minute

11

Activity 1

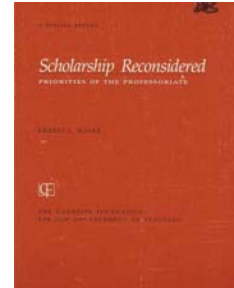
SoTL Interests/Webinar Goals

- **Describe your interest in SoTL and what you'd like to get out of the webinar.**
- **Groups/Individuals identify a few examples**
- **Report to the group**

Format from Russell Pimmel - Developing a Competitive Proposal - An Interactive, Web-Based Workshop - Division of Undergraduate Education - National Science Foundation, October, 2010

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.



Boyer, Ernest L. 1990. *Scholarship reconsidered: Priorities for the professoriate*. Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching.

Levels of Engineering Education Inquiry

- **Level 0 Teacher**
 - Teach as taught
- **Level 1 Effective Teacher**
 - Teach using accepted teaching theories and practices
- **Level 2 Scholarly Teacher**
 - Assesses performance and makes improvements
- **Level 3 Scholarship of Teaching and Learning**
 - Engages in educational experimentation, shares results
- **Level 4 Engineering Education Researcher**
 - Conducts educational research, publishes archival papers

Source: Streveler, R., Borrego, M. and Smith, K.A. 2007. Moving from the "Scholarship of Teaching and Learning" to "Educational Research:" An Example from Engineering. *Improve the Academy*, Vol. 25, 139-149.

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 - **Long Exercise**

- 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

Activity 2

SoTL Experience

- **SoTL Activities**
 - Published articles on teaching & learning?
 - Subscribe to teaching journals?
 - Read/skim teaching journals?
 - Attended teaching conferences/workshops?
 - 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
- **Report to whole group in 1 minute**

ONE Minute

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Why should we care about SoTL?

EDUCATION

Farewell, Lecture?

Eric Mazur

Discussions of education are generally predicated on the assumption that we know what education is. I hope to convince you otherwise by recounting some of my own experiences. When I started teaching introductory physics to undergraduates at Harvard University, I never asked myself how I would educate my students. I did what my teachers had done—I lectured. I thought that was how one learns. Look around anywhere in the world and you'll find lecture halls filled with students and, at the front, an instructor. This approach to education has not changed since before the Renaissance and the birth of scientific inquiry. Early in my career I received the first hints that something was wrong with teaching in this manner, but I had ignored it. Sometimes it's hard to face reality.

When I started teaching, I prepared lecture notes and then taught from them. Because my lectures deviated from the textbook, I provided students with copies of these lecture notes. The inflicting result was that on my end-of-semester evaluations—which were quite good otherwise—a number of students complained that was "lecturing straight from (his) lecture notes." What was I supposed to do? Develop a set of lecture notes different

Department of Physics, Harvard University, Cambridge, MA 02138. E-mail: mazur@physics.harvard.edu



Click here. Students continually discuss concepts among themselves and with the instructor during class. Discussions are spurred by multiple-choice conceptual questions that students answer using a clicker device. See supporting online text for examples of such "clicker questions."

from the ones I handed out? I decided to ignore the students' complaints.

A few years later, I discovered that the students were right. My lecturing was ineffective, despite the high evaluations. Early on in the physics curriculum—in week 2 of a typical introductory physics course—the Laws of Newton are presented. Every student in such a course can recite Newton's third law of

A physics professor describes his evolution from lecturing to dynamically engaging students during class and improving how they learn.

motion, which states that the force of object A on object B in an interaction between two objects is equal in magnitude to the force of B on A—it is sometimes known as "action is reaction." One day, when the course had progressed to more complicated material, I decided to test my students' understanding of this concept not by doing traditional problems, but by asking them a set of basic conceptual questions (1, 2). One of the questions, for example, requires students to compare the forces that a heavy truck and a light car exert on one another when they collide. I expected that the students would have no trouble tackling such questions, but much to my surprise, hardly a minute after the test began, one student asked, "How should I answer these questions? According to what you taught me or according to the way I usually think about these things?" To my dismay, students had great difficulty with the conceptual questions. That was when it began to dawn on me that something was amiss.

In hindsight, the reason for my students' poor performance is simple. The traditional approach to teaching reduces education to a transfer of information. Before the industrial revolution, when books were not yet mass commodities, the lecture method was the only way to transfer information from one generation to the next. However, education is so

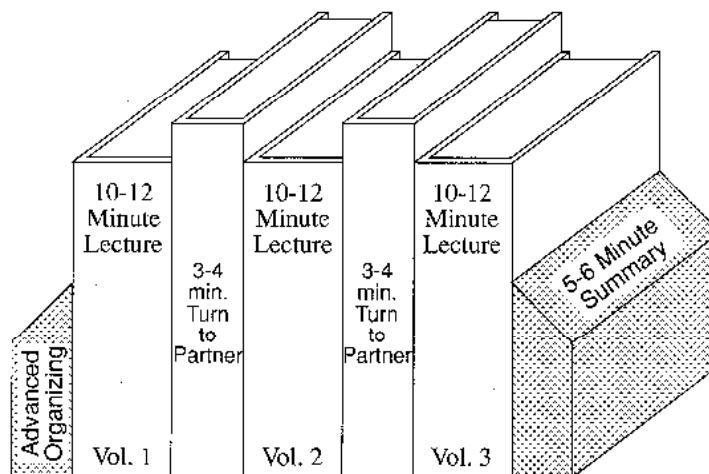
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2 JANUARY 2009 VOL 323 SCIENCE www.sciencemag.org

January 2, 2009—Science, Vol. 323—www.sciencemag.org

One Reason - Calls for evidence-based promising practices

Book Ends on a Class Session



Thinking Together: Collaborative Learning in the Sciences – Harvard University – Derek Bok Center – www.fas.harvard.edu/~bok_cen/

100-202

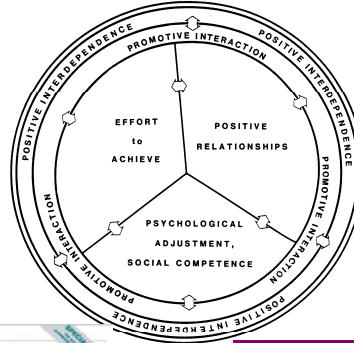
Cooperative Learning Research Support

Johnson, D.W., Johnson, R.T., & Smith, K.A. 1998. Cooperative learning returns to college: What evidence is there that it works? *Change*, 30 (4), 26-35.

- 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



January 2005



March 2007

Problem-Based Cooperative Learning

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



Josh Hilts for The New York Times
The Massachusetts Institute of Technology has changed the way it offers some introductory classes. Prof. Gabriela Sculze at a class on electricity and magnetism.

By SARA RIMER
Published: January 12, 2009

CAMBRIDGE, Mass. — For as long as anyone can remember, introductory physics at the Massachusetts Institute of Technology was taught in a vast windowless amphitheater known by its number,

COMMENTS (00)
E-MAIL
PRINT
SINGLE PAGE

January 13, 2009—New York Times — <http://www.nytimes.com/2009/01/13/us/13physics.html?em>

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Educational Transformation through Technology at MIT - TEAL - Mozilla Firefox

File Edit View History Bookmarks Tools Help http://web.mit.edu/edtech/casestudies/teal.html#video


EDUCATIONAL TRANSFORMATION THROUGH TECHNOLOGY AT MIT

OPEN EDUCATION COLLABORATIVE MIT ACTIVE LEARNING LEARNING LEARNERS

COMMUNICATE COLLABORATE CREATE

TEAL

Technology-Enhanced Active Learning



In the MIT TEAL classroom, students collaborate in small groups of three or four, working on a variety of problems. They are encouraged to work together, sharing ideas and helping each other. The TEAL classroom is designed to be a collaborative learning environment, with students working in small groups and sharing ideas. The TEAL classroom is designed to be a collaborative learning environment, with students working in small groups and sharing ideas.

TEAL IN ACTION
VIDEO - STUDENT PHYSICS
REQUIRING SUCCESS

TEAL IN ACTION
VIDEO - STUDENT PHYSICS
REQUIRING SUCCESS

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

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Physics Education Research Group

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my opinion

About the SCALE-UP Project...

This research was supported, in part, by the U.S. Department of Education, Fund for the Improvement of Post-Secondary Education (FIPSE), the National Science Foundation, Hewlett-Packard, Apple Computer, and Cisco Scientific. Opinions expressed are those of the authors and not necessarily those of our sponsors.

The primary goal of the **Student-Centered Activities for Large Enrollment Undergraduate Programs (SCALE-UP)** Project is to establish a highly collaborative, hands-on, computer-rich, interactive learning environment for large-enrollment courses.

Educational research indicates that students should collaborate on interesting tasks and be deeply involved with the material they are studying. We promote active learning in a redesigned classroom of 80 students or more (50+ students, smaller classes can also benefit). We believe the SCALE-UP Project has the potential to radically change the way large classes are taught at colleges and universities. The social interactions between students and with their teachers appear to be the "active ingredient" that makes the approach work. As more and more instruction is handled visually, via technology, the relationship-building capability of face and voice interactions becomes even more important. The pedagogical methods and classroom management techniques we design and disseminate are general enough to be used in a wide variety of classes at many different types of colleges.

Class time is spent primarily on "tossables" and "ponderables". Essentially these are hand-on activities, simulations, or interesting questions and problems. There are also some hypothesis-driven labs where students have to write detailed reports. (This research is more sophisticated than most, but shows what the best students are capable of doing.) Students sit in three groups of three students at a 7 foot diameter round table. Instructors circulate and work with teams and individuals, engaging them in Socratic-like dialogues. Each table has at least three networked laptops. The setting is very much like a banquet hall, with lively conversations nearly all of the time. Many other colleges and universities are adopting/implementing the SCALE-UP room design and pedagogy. Engineering schools are especially pleased with the SCALE-UP design, which fits in well with the requirements for ABET accreditation.

Materials developed for this course were incorporated into what became the leading introductory physics textbooks used by more than 50% of all science, math, and engineering students in the country.

Impact

Rigorous evaluations of learning have been conducted in parallel with the curriculum development effort. Besides hundreds of hours of classroom video and audio recordings, we also have conducted numerous interviews and focus groups, conducted many conceptual learning assessments (using nationally-recognized instruments in a pretest/posttest protocol), and collected portfolios of student work. We have data comparing nearly 35,000 traditional and SCALE-UP students. Our findings can be summarized as follows:

- Ability to solve problems is **improved**
- Conceptual understanding is **improved**
- Attitudes are **improved**
- Failure rates are **drastically reduced**, especially for women and minorities
- "At risk" students do better in later engineering statics classes


Details

A [chapter](#) describing the approach and its underpinnings is available. A shorter [discussion](#) is posted on the PERL website, or you can view an [article](#) describing the project from the proceedings of the Sigma Xi Forum on Reforming Undergraduate Education. The Raleigh News & Observer newspaper also has a [discussion](#) of the project. The very successful pilot project was [discussed](#) in the first issue of the Physics Education Research Supplement to the J. of Physics. See our publication [page](#) for more information.

More than 50 colleges and universities across the US have adapted the SCALE-UP approach to their own institutions. In all cases, the basic idea remains the same: get the students working together to solve a challenging problem. That frees the instructor to roam about the room, asking questions and stirring up debates. Classes in physics, chemistry, math, engineering, and even literature have been taught this way. If you want more information, please contact [Dr. Robert Beichner](#).

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

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UNIVERSITY OF MINNESOTA
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UMNews

Home > News > Releases > U of M dedicates new Science Teaching and Student Services building

News Release

U of M dedicates new Science Teaching and Student Services building

Building to serve as new hub for student life, including technology-rich "laboratories of the mind" and One Stop Student Services

Contact: Daniel Wilton, University News Service, wilton@umn.edu, 612-625-4300

MINNEAPOLIS (ST PAUL, MN) (UPI)—University of Minnesota technology and student today dedicated the new Science Teaching and Student Services (STSS) building, located at the gateway to the university's East Bank campus in Minneapolis.


The 115,000-square-foot STSS, which replaces the demolished Science Classroom Building, will be home not only to new "laboratories of the mind" and "active learning" classrooms but also to numerous student services offices, including One Stop Student Services, retention services and career services.

"This really is the kind of education at our Twin Cities campus," said university President Robert Dornhoefer. "We're grateful to the people of Minnesota for making this investment in their University."

The building, which was funded in large part by state bonding funds, has the stones and offers a wide view of the West Bank and downtown Minneapolis over the Mississippi River. It has 10 active learning classrooms, which provide for technology-driven and collaborative interaction among students and faculty. There are also five multimedia classrooms and two large lecture halls.

"Active learning classrooms are the classroom of the future and have proven results in improving educational achievement for students," said university Provost Thomas Sullivan. "There is a critical need for more degrees in science, technology, engineering and mathematics fields to meet expected job growth. This new facility supports our efforts to educate the scientists and engineers who make the discoveries of tomorrow."

In addition, the STSS is designed to meet or exceed the requirements of Minnesota's stringent LEED sustainable design code and meets LEED Gold certification. Sustainable




You're watching:
Inside Active Learning Classrooms

<http://mediamill.cla.umn.edu/mediamill/embed/78755>

http://www1.umn.edu/news/news-releases/2010/UR_CONTENT_248261.html

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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 Duch*



PBL2002:
A Pathway to Better Learning



Recipient of 1999 Hesburgh Certificate of Excellence



Please direct comments, suggestions, or requests to ud-pbl@udel.edu.
"http://www.udel.edu/pbl/"
Last updated March 13, 2004.
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<http://www.udel.edu/pbl/>

*Cooperative Learning Adopted

The American College Teacher:

National Norms for 2007-2008

Methods Used in "All" or "Most"	All – 2005	All – 2008	Assistant - 2008
Cooperative Learning	48	59	66
Group Projects	33	36	61
Grading on a curve	19	17	14
Term/research papers	35	44	47

<http://www.heri.ucfa.edu/index.php>

Questions/Comments?

- Reflect on the session thus far
- Identify questions and/or comments
- Raise your virtual hand

BREAK

15 min

29

BREAK

1 min

30

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.
- ?

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.

Diamond, R., "The Mission-Driven Faculty Reward System," in R.M. Diamond, Ed., *Field Guide to Academic Leadership*, San Francisco: Jossey-Bass, 2002



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for the ADVANCEMENT of TEACHING

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Carnegie Academy for the Scholarship of Teaching and Learning (CASTL)

[Printer-friendly version](#)

CASTL represents a major initiative of The Carnegie Foundation. Launched in 1998, the program builds on a conception of teaching as scholarly work proposed in the 1990 report, *Scholarship Reconsidered*, by former Carnegie Foundation President Ernest Boyer, and on the 1997 follow-up publication, *Scholarship Assessed*, by Charles Glassick, Mary Taylor Huber, and Gene Maeroff.

The CASTL Program seeks to support the development of a scholarship of teaching and learning that: fosters significant, long-lasting learning for all students; enhances the practice and profession of teaching; and, brings to faculty members' work as teachers the recognition and reward afforded to other forms of scholarly work.

Achieving these goals involves significant shifts in thought and practice. For faculty in most settings, teaching is a private act, limited to the teacher and students; it is rarely evaluated by professional peers. "The result," writes former Carnegie Foundation President Lee S. Shulman, "is that those who engage in innovative acts of teaching rarely build upon the work of others; nor can others build upon theirs." Thus, CASTL seeks to render teaching public, subject to critical evaluation, and usable by others in both the scholarly and the general community.

Currently, the CASTL Program is working with a wide variety of institutions (campuses, collaborative centers and organizations, scholarly societies, etc.) to broaden the reach and depth of the scholarship of teaching and learning. These efforts are focused on the CASTL [Institutional Leadership Program](#) and the CASTL [Affiliates Program](#).

Additional Information

CASTL HOME

- [Institutional Leadership Program](#)
 - [Themes and Participants](#)
- [Affiliates Program](#)
- [Previous Work](#)
- [Campus Program](#)
- [Carnegie Scholars Program](#)
- [Scholarly and Professional Societies Program](#)
- [Resources](#)

Statistics Pathway



Spotlight

<http://www.carnegiefoundation.org/scholarship-teaching-learning> (Accessed 3/19/11)

Research University Consortium
for the Advancement of the Scholarship of Teaching and Learning
Building Leadership and Community for Scholarly Inquiry into Teaching and Learning
A Carnegie Academy Leadership Cluster

This consortium of major research campuses and disciplinary societies in the United States, Canada, and Australia is assessing the position and potential of scholarship of teaching and learning (SOTL) in higher education. We have found that SOTL offers far-reaching possibilities for integrating discovery, learning, and public engagement. This international consortium supports the emerging recognition of the scholarship of teaching and learning as a powerful and integral component of the research university's mission and identity.

The scholarship of teaching and learning must be held to the same standards of rigor, relevance, peer review, and dissemination as other forms of disciplinary research and creative activity. It also must bring the same levels of rewards. The distinctive synergy between this research and learning will advance our understanding of the relationship between teaching and learning and, most importantly, enhance student learning.

These institutions significantly affect higher education through the substantial number of future faculty that they educate. We collaborate to establish standards of excellence and models of process, recognition, and reward for this kind of scholarship.



Campus-based Activities

- [Bellevue University](#)
- [Georgia State University](#)
- [Howard University](#)
- [Indiana State University](#)
- [Iowa State University](#)
- [Michigan State University](#)
- [National Communication Association](#)
- [Northwestern University](#)
- [Ohio State University](#)
- [University of British Columbia](#)
- [University of Illinois at Urbana-Champaign](#)
- [University of Maryland](#)
- [University of Minnesota, Twin Cities](#)
- [University of New South Wales](#)
- [University of Wisconsin](#)

Models, Resources, Reports

In order to advance the understanding, utility, and implementation of the scholarship of teaching and learning, the Research University Consortium has taken as its a central challenge a mapping of the field. We recognize that, while the work of an individual or campus may be compelling, more power and significance are possible if we better understand our collective activity. A mapping of that larger conversation will enable scholars, institutions, and organizations to more easily access their work and put it in context. The anticipated result is more purposeful growth for the field and its institutionalization in higher education.

The Consortium's mapping proceeds along several lines. We have first taken up issues that are of particular salience for our research priority institutions. However, we believe that those in other institutional contexts will be able to apply, adapt, and refine the following findings and recommendations.

- [Models of Scholarship](#): Genres of SOTL, examples of SOTL, SOTL, Tutorial.
- [Models for Sustaining Scholarship and Reflective Practice](#): A summary report and models of ways to promote SOTL.
- [Recognition and Rewards](#): A summary report, Iowa State's innovations, Change Magazine article, and models.
- [Preparing the Future Professionals](#): A summary report, examples of SOTL courses.
- [Partnerships with Collaboration Societies](#): A report of progress and participating groups.
- [Research the Field](#): Summary reports of SOTL activity at levels of the individual, institution, and consortium.
- [Creating a Global Campus](#): The International Society for the Scholarship of Teaching and Learning (ISSOTL).

Goals

Three areas are of special interest to research universities: [ISSOTL](#).

Assumptions

To engage in the scholarship of teaching and learning, faculty members need support from their departments, colleges, universities, and disciplinary societies: [ISSOTL](#).

Related Initiatives

Working, collaboration, multiculturalism, and other initiatives: [ISSOTL](#).

Tools for Scholarship

Bibliographies, where to publish, etc: [ISSOTL](#).



For More Information

Please contact the cluster leader, Indiana University caulfield@indiana.edu (317/955-9023), any of the [contacts at the partner institutions](#).

<http://www.cfkeep.org/html/snapshot.php?id=72191394> (Accessed 3/19/11)

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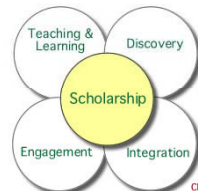
The SoTL Commons

A Conference for the Scholarship of Teaching & Learning

March 9-11, 2011

Georgia Southern University

Statesboro, Georgia, USA



Click for more details
Ernest Boyer's fourfold vision of Scholarship

The Center for Teaching, Learning, and Scholarship (CTL) will host the 4th annual "The SoTL Commons" conference on the campus of Georgia Southern University. The conference brings together people engaging in SoTL and anyone wanting to improve student learning outcomes in higher education today. The conference epitomizes that college teaching is intellectual work that is enhanced both by disciplinary scholarship and the scholarship on teaching the disciplines (SoTL). The SoTL Commons Conference is a catalyst for learning, conversations and collaborations about SoTL as a key, evidence-based way to improve student learning.

Keynote and Featured Speakers

The **keynote speakers** will be **Jennifer Meta Robinson** (Indiana University), **Bill Cerbin** (University of Wisconsin - La Crosse) and **Richard Gale** (Mount Royal University).

Qualitative Research and SoTL Projects
facilitated by Kathleen deMarras -->

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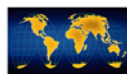
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International Journal for the Scholarship of Teaching and Learning



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About IJ-SoTL

International Journal for the Scholarship of Teaching & Learning is an open, peer-reviewed, international electronic journal published twice a year by the Center for Teaching, Learning & Scholarship at Georgia Southern University to be an international vehicle for articles, essays, and discussions about the scholarship of teaching and learning (SoTL) and its applications in higher-education today. All submissions undergo a double-blind peer-review process.

SoTL is a key way to improve teaching effectiveness, student learning outcomes, and the continuous transformation of academic cultures and communities. Through research questions and methodologies applied to teaching and learning, the making public of that research and its results so that it can be analyzed and critiqued, and through the constructing of an available, growing body of knowledge, understanding, and wisdom about the teaching and learning processes and outcomes, college and university teaching is seen as a serious intellectual activity that can be evidence and outcome based.

SoTL is an international momentum or movement. IJ-SoTL seeks to be a virtual SoTL Commons for research articles, invited essays, and reflections about the value, implementation, and development of SoTL in various academic contexts and cultures. The Editorial Review Board of IJ-SoTL is profoundly strong and international in scope, and the goal is for submissions, published papers, and the readership to be truly international. Through email, published responses to articles, and a listserv, IJ-SoTL encourages your participation, questions and comments in order to foster international conversations about SoTL, as well as international collaboration in SoTL.

The bamboo plant is the symbol for IJ-SoTL. It grows around the world, it grows rapidly, its sections are as steps in the process of growth and awareness, and it always has green shoots and leaves as signs of its vitality. Bamboo has been a symbol for longevity, strength and grace. It bends without breaking while having a tensile strength similar to steel. It has had a great reputation in both ancient and modern civilizations for its effective uses and for taking root in all sorts of climates. Such is SoTL and such is the goal for IJ-SoTL.



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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=IBYrKPoVFwg>
- Belcher – Technology Enabled Active Learning – Physics – MIT
<http://web.mit.edu/edtech/casestudies/teal.html#video>
- Wright – Inside Active Learning Classrooms – Biology – University of Minnesota -
http://www.youtube.com/watch?v=IfT_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 - Long Exercise

- 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

Activity 2

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?
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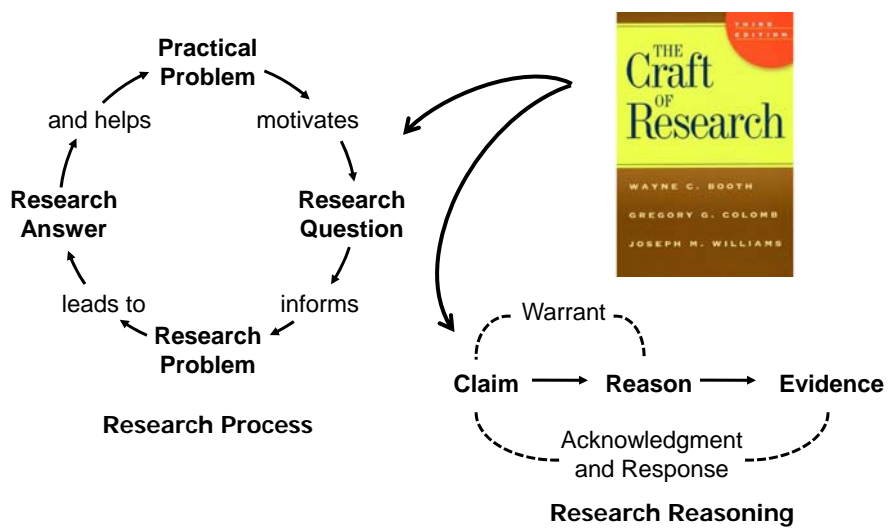
ONE Minute

44

Workshop Resources

- Handouts
 - Streveler, R., Borrego, M. and Smith, K.A. 2007. Moving from the “Scholarship of Teaching and Learning” to “Educational Research:” An Example from Engineering. Silver Anniversary Edition of *To Improve the Academy*, Vol. 25, 139-149.
 - Wankat, P.C., Felder, R.M., Smith, K.A. and Oreovicz, F. 2001. The scholarship of teaching and learning in engineering. In Huber, M.T & Morreale, S. (Eds.), *Disciplinary styles in the scholarship of teaching and learning: A conversation*. San Francisco: Jossey-Bass.
- Websites
 - International Journal of the Scholarship of Teaching and Learning - <http://academics.georgiasouthern.edu/ijotl/index.htm>
 - 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
 - Booth, W.C., G.G. Colomb, and J.M. Williams. 2008. *The craft of research*. 3rd ed. Chicago, IL: The University of Chicago Press
 - National Research Council. 2002. *Scientific research in education*. R.J. Shavelson and L. Towne, eds. Washington, DC: The National Academies Press; http://www.nap.edu/openbook.php?record_id=10236&page=R1

The research process and reasoning



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

Workshop Resources

- Recommended
 - Benson, L., Becker, K., Cooper, M. Griffin, H. & Smith, K. 2010. Engineering Education: Departments, Degrees and Directions. *International Journal of Engineering Education*, 26 (5), 1042-1048.
 - Borrego, M., R.A. Streveler, R.L. Miller, and K.A. Smith. 2008. A new paradigm for a new field: Communicating representations of engineering education research. *Journal of Engineering Education* 97 (2): 147-162.
 - Duderstadt, J. J. 2008. *Engineering for a changing world: A roadmap to the future of engineering practice, research, and education*. The Millennium Project, The University of Michigan. (<http://milproj.dc.umich.edu/>)
 - Jamieson, L.H. and Lohmann, J. R. 2009. *Creating a culture for scholarly and systematic innovation in engineering education*. Washington, DC: American Society for Engineering Education.
 - Paulsen, M. B. 2001. The relation between research and the scholarship of teaching. *New Directions for Teaching and Learning*: No. 86, pp. 19-29.
 - Streveler, R.A., and K.A. Smith. 2006. Conducting rigorous research in engineering education. *Journal of Engineering Education* 95 (2): 103-105.
 - Streveler, R.A. and Smith, K.A. 2010. From the Margins to the Mainstream: The Emerging Landscape of Engineering Education Research. *Journal of Engineering Education*, 99(4), 285-287.

Workshop Resources

- Additional

- Adams, R., L. Fleming, and K. Smith. 2007. Becoming an engineering education researcher: Three researchers stories and their intersections, extensions, and lessons. *Proceedings, International Conference on Research in Engineering Education*; http://www.ce.umn.edu/~smith/docs/Adams-Fleming-Smith-Becoming_an_engineering_education_researcher-ICREE2007.pdf
- Booth, W.C., G.G. Colomb, and J.M. Williams. 2008. *The craft of research*. 3rd ed. Chicago, IL: The University of Chicago Press.
- Boyer, Ernest L. 1990. *Scholarship reconsidered: Priorities for the professoriate*. Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching.
- Center for the Advancement of Scholarship on Engineering Education; <http://www.nae.edu/nae/caseecomnew.nsl>
- Diamond, R., "The Mission-Driven Faculty Reward System," in R.M. Diamond, Ed., *Field Guide to Academic Leadership*, San Francisco: Jossey-Bass, 2002
- Diamond R. & Adam, B. 1993. *Recognizing faculty work: Reward systems for the year 2000*. San Francisco, CA: Jossey-Bass.
- *Journal of Engineering Education*; <http://www.asee.org/publications/jee/index.cfm>
- Hutchings, P., and Shulman, L.S. 1999. The scholarship of teaching: New elaborations, new developments. *Change*, 31 (5), 10-15. <http://www.carnegiefoundation.org/publications/sub.asp?key=452&subkey=613>
- National Research Council. 2002. *Scientific research in education*. R.J. Shavelson and L. Towne, eds. Washington, DC: The National Academies Press; http://www.nap.edu/openbook.php?record_id=10236&page=R1
- Shulman, Lee S. 1999. Taking learning seriously. *Change*, 31 (4), 11-17.
- Smith, K.A. 2006. Continuing to build engineering education research capabilities. *IEEE Transactions on Education* 49 (1): 1-3; <http://www.asee.org/conferences/international/2008/upload/Continuing-to-Build-Eng-Education-Research-Capabilities.pdf>

Contact Information:

- Karl A. Smith, Ph.D.
Cooperative Learning Professor of Engineering Education
School of Engineering Education
Purdue University (Part Time)
Neil Armstrong Hall, Rm 1313
701 West Stadium Avenue
Purdue University
West Lafayette, IN 47907-2045
<https://engineering.purdue.edu/ENE/>

Morse-Alumni Distinguished Teaching Professor
Professor of Civil Engineering
Civil Engineering (Phased Retirement)
University of Minnesota
236 Civil Engineering
500 Pillsbury Drive SE
Minneapolis, MN 55455
<http://www.ce.umn.edu/people/faculty/smith/>

E-mail: ksmith@umn.edu
Skype: kasmithtc

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