

The Scholarship of Teaching and Learning: A Discipline Approach

Michael D. Boyle¹

In 1990, Ernest Boyer published his extremely influential *Scholarship Reconsidered: Priorities of the Professoriate*.² In *Scholarship Reconsidered*, Boyer proposed that the definition of scholarship be extended beyond the traditional emphasis on basic research or discovery to encompass the scholarships of integration, application, and teaching. Over the next decade this proposition was hotly debated, not only in terms of the categories themselves, but also in how to assess scholarship across the four domains, and how that information should be used to encourage and reward faculty. This led a number of scholars with the Carnegie Foundation for the Advancement of Teaching to publish *Scholarship Reassessed*, which proposed adding the term “learning” to the scholarship of teaching.³ A 2002 report, “Institutionalizing a Broader View of Scholarship through Boyer’s Four Domains,” provides a detailed overview of their deliberations on Boyer’s work.⁴ Together, these works sustain the “Scholarship of Teaching and Learning” (SoTL).

For those of us traditionally trained in the “Scholarship of Discovery,” this redefinition was not a concern. In the research-

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intensive setting the scholarship of discovery remains the most revered form of faculty scholarship, with service and good teaching being considered bonuses in promotion and tenure decisions. The “publish or perish” mentality, now subtly modified to include the ability to garner extramural funding, remains the driving force for promotion and tenure in Carnegie I institutions. Indeed, at research-intensive universities any interest in pedagogy was more likely to be ridiculed than encouraged. What, however, should be the expectation at a liberal arts college like Juniata, which views its major mission as education?

Juniata reports that about 95 percent of our faculty have earned doctorates or hold a terminal degree in their academic field. In the field of Biology, and most of the other sciences, this would be a Ph.D. obtained by successfully completing graduate studies in the scholarship of discovery. Many of the individuals holding faculty positions in the sciences here, as well as at peer and aspirant institutions, are likely never to have taken a formal class in pedagogy, classroom management, or educational methods. Is this good? Should our faculty have a commitment to the scholarship of teaching and learning or just scholarly teaching? What exactly is the difference? How do you know where you stand?

For my science colleagues, I am proposing a novel method to evaluate their expertise and commitment to the scholarship of teaching and learning. The SoTL score, somewhat like your credit rating, would be calculated using the following formula.

$$\text{SoTL} = (d-p)/t$$

Where **d** is the number of discipline specific journals to which you subscribe; **p** the number of journals related to education and pedagogy to which you subscribe; and **t** the total.

Assuming that you subscribe to at least one journal, your score can range from -1 to 1. The closer your interests lie toward the scholarship of discovery, the closer your score will approach 1. The more committed you are to the scholarship of teaching and learning, the closer your score will approach -1. This scoring system has a number of inherent and perhaps flawed assumptions, beginning with the presumption that those who subscribe to a particular journal actually read and understand at least part of its

content. Perhaps a more rigorous test would be to evaluate *d* and *p* in terms of abstracts or peer-reviewed publications in each area of scholarship over the prior five years.

Although I have not actually field-tested the SoTL scoring system before this talk, I would confidently predict a very small percentage of the faculty with offices in the Von Liebig Science Center have a negative score. My own score was greater than 0.95, using either method of calculation. It was only after coming to Juniata that it even occurred to me this was not necessarily something to be proud of!

So for those of you who were trained exclusively in the discovery track, how do you find out what is involved in the scholarship of teaching and learning and if it is something that merits your attention? A solid foundation already exists within the Carnegie Academy for the Scholarship of Teaching and Learning (CASTL) originally directed by Ernest Boyer. “CASTL seeks to support the development of a scholarship of teaching and learning that: 1) fosters significant, long-lasting learning for all students; 2) enhances the practice and profession of teaching; and 3) brings to faculty members' work as teachers the recognition and reward afforded to other forms of scholarly work.”⁵ According to Lee Shulman, the current President of the Carnegie Foundation for the Advancement of Teaching, the scholarship of teaching and learning should manifest at least three key characteristics: 1) it should be public; 2) it should be susceptible to critical review and evaluation; and 3) it should be accessible for exchange and use by other members of one's scholarly community.⁶

While these objectives seem consistent with any form of scholarly work, how do you get started in a new research area? Entering any new field there are a number of barriers. SoTL, like every area of scholarship, has its own terminology that serves as a barrier to communication and interaction among interested scholars from different disciplines. Entering the unknown with a group who speak your language and a series of guides who are multi-lingual reduces the initial fear and energy required. This is where a disciplinary approach has significant value and, in part, why last year the American Society for Microbiology (ASM) established its Scholars-in-Residence Program. This initiative brought sixteen faculty members who taught undergraduate

microbiology together to interact with six microbiologists who were also current or prior Carnegie Scholars.

The common background of the participants allowed easy comparisons between principles and practices of hypothesis-driven research models in microbiology and design and implementation of studies in SoTL.⁷ For me this was the ability to see the goal of teaching and learning in terms of bacterial growth, enzyme kinetics and thermodynamics and to be able to appreciate that, just as in a dynamic biological system, it is important to appreciate all of the variables.

It was also clear that in either the fields of scholarship of discovery or SoTL, the ability to formulate good research questions and develop an effective experimental design and collect and analyze appropriate data is not easy. Just as in basic scientific research, the need for pilot studies and the high probability that the initial studies would lead to uninterruptible results should be anticipated.

Two important insights emerged from this comparison. First, while the classroom is a laboratory for SoTL, the scholarship of teaching and learning is not the same as how effective a teacher you may be. Just as the ability to protect the blood supply from transfusion transmission of HIV uses a test, which resulted from basic research directed at the problem, the test itself uses an entirely different approach. Developing a better way to help students understand signal transduction in cells exposed to tetanus toxin or any complex biological or chemical cascade may require a number of different teaching strategies before finding the best approach that works for the majority of students. Similarly, introducing new technology into the classroom may be advantageous but the first time it is used it will be a challenge for the instructor if adequate training is not provided, and will be of limited or negative value if it doesn't work when needed.

The expected need for pilot studies and the anticipation of technical failure in initial studies revealed a second insight. Of the sixteen scholars present at the inaugural ASM program, approximately half were in the pipeline for promotion and tenure. This group indicated that a large part of their teaching evaluation was based on student evaluations so they were frightened of conducting any pilot study. They did not feel that promotion and

tenure committees or their schools' administration would balance the value of research in teaching and learning with potential negative student evaluations if the pilot study were to have problems. For those of you have read *Declining by Degrees*,⁸ the correlation between using student evaluations as a major component of faculty promotion and tenure decisions and grade inflation will not be lost on you.

One of the keys to any form of scholarship is having clear objectives and a good question that merits an answer. In the ASM program the scholars were given the following objectives:

- Develop a hypothesis to explore student learning in microbiology
- Design an experiment using their classes to test the hypothesis
- Identify existing resources regularly used to assess student learning
- Understand methods of collecting and interpreting data used to measure student learning
- Understand IRB requirements for conducting research on students
- Identify appropriate venues for publishing their research

Within these objectives are a number of themes that were at the core of the Carnegie project on the scholarship of teaching and learning. Notable is the need to make the results available for peer-review and for use by your colleagues. Inherent in the assignment is the need to follow ethical research principles, e.g. meeting Internal Review Board requirements as well as being aware of what scholarly work already exists. In addition, what methodology could be applied to a given problem? What are the limits of that method? How will data be collected and analyzed? As noted earlier, these considerations apply to all areas of scholarship. Fortunately again there are resources on which you can draw to support SoTL research.

For literature surveys, the ERIC database (<http://www.eric.ed.gov/>) is a wonderful resource. The US Department of Education sponsors the Education Resources Information Center (ERIC) that maintains a comprehensive database of journal and

non-journal education literature. The ERIC online system provides faculty with a free, centralized, searchable database of more than 1.1 million citations going back to 1966. For assessment there are a series of valuable resources, in particular the Field-tested Learning Assessment Guide, FLAG (<http://www.flaguide.org/index.php>). FLAG was developed by NSF for instructors in science, math, engineering, and technology (STEM). The FLAG contains an assessment primer section to help you select the most appropriate assessment technique(s) for your course as well as providing a user-friendly handbook for project evaluation. FLAG offers broadly applicable, self-contained modular classroom assessment techniques (CATs) as well as discipline-specific tools for STEM instructors interested in new approaches to evaluating student learning, attitudes, and performance. Each has been developed, tested, and refined in college and university classrooms.

Although there are many other resources available, one other that I would draw to your attention is SENCER (Science Education for New Civic Engagements and Responsibilities). “SENCER engages student interest in the sciences and mathematics by supporting the development of undergraduate courses and academic programs that teach ‘to’ basic science and mathematics ‘through’ complex, capacious, and unsolved public issues.”⁹ The advantages of this NSF-funded project is that it has online pre- and post-tests and the organization collects and analyzes the data for you. This is an attitude type survey that Don Braxton and I are using to assess the impact of our Genomics and Ethics course on the students’ civic engagement with issues associated with the human genome project.

This leads to my final question—where should Juniata’s SoTL score be as an institution? Obviously we need a formula to calculate a college’s SoTL score (SoC). I suggest the following, once again a poorly researched and untested equation to achieve this goal.

$$\text{SoC} = (\text{d-p}) / \text{t} + 1$$

Where **d** is the number of peer-reviewed discipline specific papers published by your institution; **p** is the number of peer-reviewed

papers related to the scholarship of teaching and learning published by your institution; and t is the total. Once again the potential range of the SoC numbers generated is between 1 and -1. While discovery-centered institutions like Harvard and MIT would be expected to score close to 1, and technical and community colleges might be expected to be neutral or slightly negative, what is the appropriate target score for a liberal arts college like Juniata? Do we want to be recognized as contributing to the scholarship of teaching and learning? Even if we do not contribute to original research in this field should we as a faculty spend more time discussing best practices in teaching and learning?

Thank you.



Guide to Resources in the Scholarship of Teaching and Learning

The American Society of Microbiology Site at
<http://www.asmcue.org/index.asp?bid=2717>

The Scholarship of Teaching and Learning (SoTL): A Beginner's View
Curtis D. Bennett, University of Wisconsin-La Crosse, Carnegie Scholar
2000-2001

SoTL Defined

Transcript from a talk by Bill Cerbin, Provost Office, University of
Wisconsin-La Crosse
<http://www.uwlax.edu/sotl/index.htm?sotldefinedpage.htm>

The Scholarship of Teaching: What's the Problem?

Randy Bass, Georgetown University
<http://www.doiiiit.gmu.edu/Archives/feb98/rbass.htm>

Literature review

The Education Resources Information Center (ERIC), sponsored by the Institute
of Education Sciences (IES) of the U.S. Department of Education
<http://www.eric.ed.gov/>

The Scholarship of Teaching and Learning in Higher Education: An
Annotated Bibliography

<http://www.carnegiefoundation.org/publications/sub.asp?key=452&subkey=615>

Assessment

FLAG. The Field-tested Learning Assessment Guide

<http://www.flaguide.org/index.php>

SENCER. Science Education for New Civic Engagements and Responsibilities

<http://www.sencer.net/index.cfm>

SALG. The Student Assessment of Learning Gains instrument [SENCER instructor link].

<http://www.wcer.wisc.edu/salgains/instructor/>

VARK- a guide to learning styles.

<http://www.vark-learn.com/english/index.asp>

CLASS Colorado Learning Attitudes about Science Survey.

<http://cosmos.colorado.edu/phet/survey/CLASS/>



NOTES

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- ² E. L. Boyer, *Scholarship Reconsidered: Priorities of the Professoriate* (Princeton, NJ: Carnegie Foundation for the Advancement of Teaching, 1990).
- ³ C. E. Glassick, M.T. Huber, and G.I. Maeroff, *Scholarship Assessed: Evaluation of the Professoriate* (San Francisco: Jossey-Bass, 1997).
- ⁴ John M. Braxton, William Luckey, and Patricia Helland, eds., "Institutionalizing a Broader View of Scholarship Through Boyer's Four Domains," *ASHE-ERIC Higher Education Report*, 29:2 (2002).
- ⁵ Lee Shulman, "Course Anatomy: The Dissection and Analysis of Knowledge Through Teaching," in *The Course Portfolio: How Faculty Can Examine Their Teaching to Advance Practice and Improve Student Learning*, ed. by Pat Hutchings (Washington, D.C.: American Association for Higher Education, 1998), 5-12.
- ⁶ Ibid.
- ⁷ Alix Darden, "On the Nature of Scholarship of Teaching and Learning: Comparing Disciplinary Research and Educational Research," *ASM News*, 68:4 (2002), 152-53.
- ⁸ Richard H. Hersh and John Merrow, eds., *Declining by Degrees: Higher Education at Risk* (New York: Palgrave Macmillan, 2005).
- ⁹ <http://www.sencer.net/index.cfm> (Accessed December 4, 2005).