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Emphasizing Learning in the Scholarship of Teaching and Learning

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Abstract
The *learning question* in the scholarship of teaching and learning focuses on whether the work advances student learning. Although the scope of inquiry may vary, the learning question is, first and foremost, about outcomes—*what* or *how much* did students learn. It is typified by these kinds of research questions: Did the new teaching method I used produce better learning than the traditional method I have been using; Did the new assignment I used result in better student performance than the one I typically use; Did the strategy our department adopted have a positive effect on student performance in the capstone course; Did our institutional emphasis on critical thinking lead to better thinking among students across the disciplines.

Keywords
Scholarship of teaching and learning, Conceptual understanding, Disciplinary expertise

Emphasizing *Learning* in the Scholarship of Teaching and Learning

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> . . . *the scholarship of teaching and learning is now shaping the way teachers teach (and think about their teaching) in a multitude of ways—some modest, some ground-shifting. But a focus on teaching clearly begs another question, and it is one we hear more and more often—from those who undertake such work, from campus leaders who support it, and from those who think about higher education policy in a broader sense: Does the scholarship of teaching and learning improve outcomes for students?*
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> (Hutchings, Huber, & Ciccone, 2011, p. 38)

The *learning question* in the scholarship of teaching and learning focuses on whether the work advances student learning. Although the scope of inquiry may vary, the learning question is, first and foremost, about outcomes—*what* or *how much* did students learn. It is typified by these kinds of *research* questions: Did the new teaching method I used produce better learning than the traditional method I have been using; Did the new assignment I used result in better student performance than the one I typically use; Did the strategy our department adopted have a positive effect on student performance in the capstone course; Did our institutional emphasis on critical thinking lead to better thinking among students across the disciplines.

No doubt, the focus on outcomes is important. As Hutchings, Huber and Ciccone (2011) note, everyone from classroom teachers to policy makers want to know—what works. Determining how well a strategy, method or program works can have significant implications for teachers and students. Better learning is not only a major goal for classroom inquiry projects, it has come to represent a kind of threshold criterion that determines the practical value of the work, and suggests that the most important work is that which demonstrates a positive effect on student learning.

Not every practitioner believes that the main reason to undertake the scholarship of teaching and learning is to demonstrate *what works*. But it seems that the popular conception is skewed in that direction. In working with hundreds of college teachers, I have seen a pervasive tendency to equate classroom inquiry with assessment of teaching methods. Teachers try out a new instructional strategy to teach critical thinking, a complex skill, or some concept in their course, and then assess student learning to find out how well it works. Some undertake studies to compare one method (the new one) with another (the traditional one) to see which one results in better learning.

The effort to connect one's teaching directly to learning outcomes reflects desirable advances in higher education as teachers take responsibility for student learning, articulate learning outcomes for their courses and programs, and systematically examine whether outcomes are achieved. These are the types of activities, as others have suggested, that can help build stronger connections between classroom teaching and institutional outcomes

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assessment (Hutchings, Huber, & Ciccone, 2011). It may be that the ongoing emphasis on outcomes assessment in higher education has raised awareness that outcomes are important, and now the scholarship of teaching and learning is viewed as a vehicle for doing assessment.

However, when outcomes are the primary focus, *learning* is viewed mainly as a criterion for teaching effectiveness rather than as an object of inquiry in its own right. Attending to the endpoint of learning (outcomes) diverts attention away from exploring the paths that students take to get to the outcomes (how students learn). This has significant consequences; you may find out, for example, that a majority of students do poorly on some measure of learning but not know how or why that happened. As a teacher you have little basis for deciding what to change to improve subsequent learning. Ironically, outcome-oriented studies may not produce the best kind of evidence or knowledge needed to improve teaching and student learning.

A different way to address the learning question is to make learning the object of inquiry. *Learning studies*, if we can call them that, start with questions about how students develop knowledge and skills from a particular instructional strategy, where and why students have difficulty, and why they don't achieve as well as expected. The goal is to better understand learning itself, not just in terms of general principles, but how students learn and develop specific concepts, skills, habits of mind, and sensibilities relevant to one's discipline. Understanding how students learn what we teach is an important ingredient or precursor for instructional design and decisions about how to better support learning.

To illustrate, consider several approaches to *learning*-oriented classroom inquiry that focus on conceptual understanding and the development of disciplinary expertise.

Conceptual understanding. Teachers want students to develop deep understanding of the subject matter in their fields. But deep understanding is an elusive goal, not an automatic consequence of any particular teaching method or experience. Teachers are often dissatisfied with their students' grasp of important concepts and ideas. Recognizing that deep understanding is a persistent problem, some educators have turned to classroom inquiry to explore what makes understanding certain concepts difficult for students and what specific factors may facilitate or impede how understanding develops. As one scholar notes, *one of the most important questions an educator can ask falls into just four words: What makes this hard?* (Perkins, 2007, p. 31). An example of this approach is the work on *threshold concepts*. These are gateway concepts that are both a barrier to and an entrance into understanding the substance of a discipline, e.g., *complex numbers* and *limit* in mathematics, *opportunity costs* in economics, *signification* in literary studies, *gravity* in physics, *osmosis* in biology, *representation* in philosophy (Meyer and Land, 2003).

> *The idea of threshold concepts is an invitation to instructors to look deeply into their disciplines and into their teaching experience, identifying likely threshold concepts and investing special attention in helping students to master them (Perkins, 2007, p. 36).*

Much work has focused on identifying threshold concepts in various disciplines (Irvine & Carmichael, 2009). To bring the work full circle educators need to explore how students interpret and grapple with these ideas, and then use that information to develop instructional strategies to help students overcome the conceptual barriers. Finally, of

course, it *is* important to document how well those strategies work in terms of student learning (outcomes).

A related line of work on conceptual understanding focuses on misconceptions—the kinds of erroneous ideas and beliefs that students bring to our classes or develop in our classes. Misconceptions are a natural part of learning and many of them are formidable barriers to future learning. Misconceptions sometimes lead students to reject alternative disciplinary knowledge. Or, in some cases, students' understanding appears to change, temporarily. A well documented pattern is that students enter a course with misconceptions about some of the basic concepts in the discipline, then learn the consensually held view of the concepts well enough to pass the tests in the course, but then revert back to their original misconceptions after completing the course (Clements, 1982).

Educators in some fields, especially the STEM areas, have identified many major misconceptions endemic to their disciplines (Singer, Nielsen & Schweingruber, 2012). Cataloguing major disciplinary misconceptions has led to the development of *concept inventories,* which can help instructors identify patterns of misconceptions in their classes. A typical inventory consists of multiple-choice test items in which each *incorrect* response option for an item reflects a particular way to construe the concept being tested, and thus reveals something about students' mental models of the concept. In other words, the inventory gauges types of understanding (i.e., misconceptions) rather than whether or not a student has *correct* understanding of a topic as one might expect from a traditional classroom test. By understanding how students construe a concept, teachers can then explore how specific instructional activities may promote conceptual change (Cerbin, 2012).

Developing disciplinary expertise. Teachers want students to develop the knowledge, skills and habits of mind that typify their disciplines. Disciplinary expertise includes not only mastery of subject matter but *know how*, being able to use the subject matter to analyze, evaluate and develop ideas in the field. We may expect students to develop disciplinary expertise as they progress through the curriculum but we have relatively little evidence about how they do so (Donald, 2002).

An approach known as *decoding the disciplines* is a programmatic effort to understand and support disciplinary thinking (Middendorf & Pace, 2004). Instructors identify disciplinary bottlenecks—concepts or skills that are especially difficult for students—and then design ways to scaffold more accomplished or expert-like performance.

Several examples illustrate the types of complex thinking instructors have explored:

- problems students experience in reading historical texts
- types of mental models essential for understanding complex biological processes
- difficulties students experience in trying to work with three dimensional visualizations of astronomical phenomena
- students' difficulties in recognizing and using historical evidence

As the authors suggest, understanding how students experience these bottlenecks is an important precursor to instructional design.

> *The systematic identification of what students have difficulty learning and what they should know how to do makes the design of methods for practice and effective assessments relatively straightforward.* (Middendorf & Pace, 2004, p. 4)

A third approach that focuses on investigating student learning is *lesson study*. Based on practices used widely in Asian education, lesson study is a form of inquiry in which groups of instructors jointly design, teach, observe, analyze and refine an individual class lesson (Cerbin, 2011). Instructors start by identifying a key learning goal or a significant learning problem in their class. Then by designing and teaching a lesson that makes students' thinking visible, the team observes how students respond to instructional activities, that is, how students learn from instruction.

Consider an example of a lesson study in an introductory psychology course. Several instructors (including me) decided to investigate a common problem among introductory level students—their tendency to oversimplify behavior and explain it in terms of a single overriding factor, e.g., people are depressed because they have low self esteem. Our lesson study focused on how to develop students' ability to analyze behavior in terms of multiple factors—an ability we believe is fundamental to psychological reasoning. Toward this end, we designed a lesson in which students analyzed scenarios that depicted various social dilemmas, and had to predict and explain how the protagonists would act. During the class period in which the lesson was taught we observed students becoming more adept at identifying situational factors to explain social behavior.

From an outcomes perspective the lesson was successful—students were better able to analyze behavior in terms of multiple factors. But we also experienced a pivotal moment when we observed a student say to her group members, "Yes, there are all these factors, but what really matters is what kind of person you are. Whether you are a good or bad person, will determine what you do." She revealed a belief, shared by other students in the group, that a person's character is a more important influence on behavior than situational factors and the social context. In other words, at the end of the lesson, some students rejected what the lesson was intended to teach. Students were capable of doing the kind of thinking we wanted, but they viewed their belief in the dominance of one's character as a better way to explain behavior than our discipline-based view. In this case, observing students during the lesson helped us understand the basis of students' performance, and led us to revise the course to address the more fundamental problem we had uncovered (Cerbin, Wilson, Cary, & Dixon, 2007).

These approaches to the study of learning in the disciplines illustrate that it is important for practitioners to think about the scholarship of teaching and learning as more than a quest to determine what works. Equally important is an effort to understand how and why things work. The scholarship of teaching and learning is an endeavor to build a professional knowledge base for teaching, consisting of pedagogical content knowledge

> *. . . the most useful forms of representation of [topics], the most powerful analogies, illustrations, examples, explanations, and demonstrations—in a word, the ways of representing and formulating the subject that make it comprehensible to others . . . Pedagogical content knowledge also includes an understanding of what makes the learning of specific topics easy or difficult: the conceptions and preconceptions that students of different ages and backgrounds bring with them to the learning of those most frequently taught topics and lessons . . .* (Shulman, 1986, p.9)

Of course, to build pedagogical content knowledge we need work that focuses on the process of learning and on learning outcomes. Studies that probe the process of learning

can help us develop specific pedagogical content knowledge needed to inform the design of instructional practices. And, outcome-oriented studies can document whether that instruction leads to improvements in student learning.

An expanded version of the learning question for the scholarship of teaching and learning might be—*what, how and why do students learn or not learn what we teach them*?

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