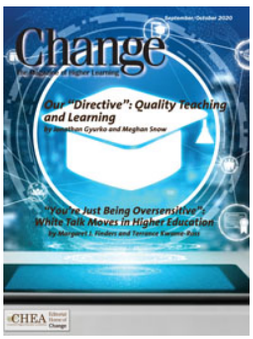

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Scholarly Teaching for All, Research for Some:

On the Roles of Research and Scholarship of Education in the Disciplines

By Marco Molinaro, Noah Finkelstein, Kelly Hogan, Natalie Mendoza, and Viji Sathy

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In Short

- Drawing from a rich history of work in scholarship of teaching and learning and discipline-based education research allows for the categorization of the various types of teaching practices and provides a mechanism to differentiate these teaching practices from knowledge generation in education.
- Categorization of teaching practices, combined with an examination of the expectations of quantity and quality of teaching and research, highlights the distinctions among the duties for different types of faculty positions.
- As our institutions pursue their educational missions, this article provides language to support discussions around our expectations of teaching and the broad array of faculty positions that support these ends.

With the growth and increased variation of faculty roles on our research-intensive campuses have come varied expectations with respect to teaching, service, and research. For example, the teaching professor role has become more prevalent on many of our campuses. While this position draws on the history of teaching conducted by instructors and lecturers, it may also come with expectations of knowledge production (scholarship, research, and creative work).

In parallel, over the last two decades there has been a growth in tenure-line research faculty being hired into disciplinary departments (e.g., physics) to conduct research on the nature of learning within these disciplines, referred to as discipline-based education research (DBER). DBER faculty are expected to produce research in education in their fields that is parallel to that of other disciplinary experts (e.g., who publish in atomic physics); simultaneously, there is an expectation that these positions enhance the quality and practices of education in the department.

Each of these relatively new faculty positions affords many opportunities for supporting our institutions as they increasingly emphasize and value teaching, draw on and contribute to decades of scholarship on teaching in higher education, become more student-facing, and emphasize diversity, equity, and inclusion. By defining and distinguishing among the various faculty roles that are involved in studying and enacting educational practices, we seek to elevate the value of teaching for all and make the work of teaching more visible.

In this piece we introduce a categorization of the various types of teaching practice, differentiating them from knowledge generation in the disciplines. We then draw distinctions among the duties for different types of faculty positions and call for concrete expectations among these positions and duties. We argue that all faculty at institutions of higher education should be engaged in some form of scholarly teaching (discussed more below), and some faculty should be hired into knowledge-generating positions of DBER and/or scholarship of teaching and learning (SOTL), to conduct research on the nature of learning and teaching in the disciplines—providing basic research and development for scholarly teaching. Ultimately, we strive to provide language to support discussions around roles of teaching and scholarly work in education. Although we focus on research-intensive institutions, we suspect this discussion is worth having across the array of institutions of higher education.

Drawing From DBER and SOTL

To help advance teaching and educational scholarship in the disciplines, we draw from both SOTL (Hutchings & Shulman, 1999) and DBER (NRC, 2012) communities. Both have focused on educational transformation and improving teaching and learning in colleges and universities. However, given both their history and focus, there are good

reasons for understanding SOTL and DBER as separate communities.

The roots of SOTL lie in Ernest Boyer's (2002) calls for acknowledging four forms of scholarship, including teaching. These calls have been defined and substantially expanded by many. Hutchings and Shuman (1999) and many others argued that SOTL goes well beyond excellent teaching in the classroom. As Huber and Morreale (2002) stated, the distinctive character of SOTL "lies in its invitation to mainstream faculty (as well as specialists) to treat teaching as a form of inquiry into student learning, to share results of that inquiry with colleagues, and to critique and build on one another's work" (p. 16).

Since at least the early 2000s, many faculty members have welcomed and accepted this invitation to examine their teaching as a form of intellectual inquiry similar to how they approach their discipline-specific research agenda. Historians, for instance, have produced a body of knowledge, HistorySOTL, that the discipline's major professional organization, the American Historical Association, has recently recognized as essential and valuable for the research and practice of teaching and learning in history (Mendoza et al., 2019).

The growth and recognition of SOTL very likely contributed to the development of discipline-based education research. DBER efforts have become subfields of many disciplines complementing other research areas within a field. For example, many physics departments across the country and internationally now include physics education research as a field alongside disciplinary mainstays such as atomic and optical physics. Recognition of DBER fields also can be seen in statements by professional societies, the establishment of journals, and the emergence of graduate and postdoctoral opportunities (NRC, 2012, p. 19).

Notably, DBER has historically been concentrated in the science, technology, engineering, and mathematics (STEM) disciplines. The NRC report that examines DBER in the STEM fields describes DBER research as an endeavor that:

> investigates learning and teaching in a discipline from a perspective that reflects the discipline's priorities, world view, knowledge, and practices. … It is informed by and complementary to more general research on human learning and cognition. (NRC, 2012, p. 9)

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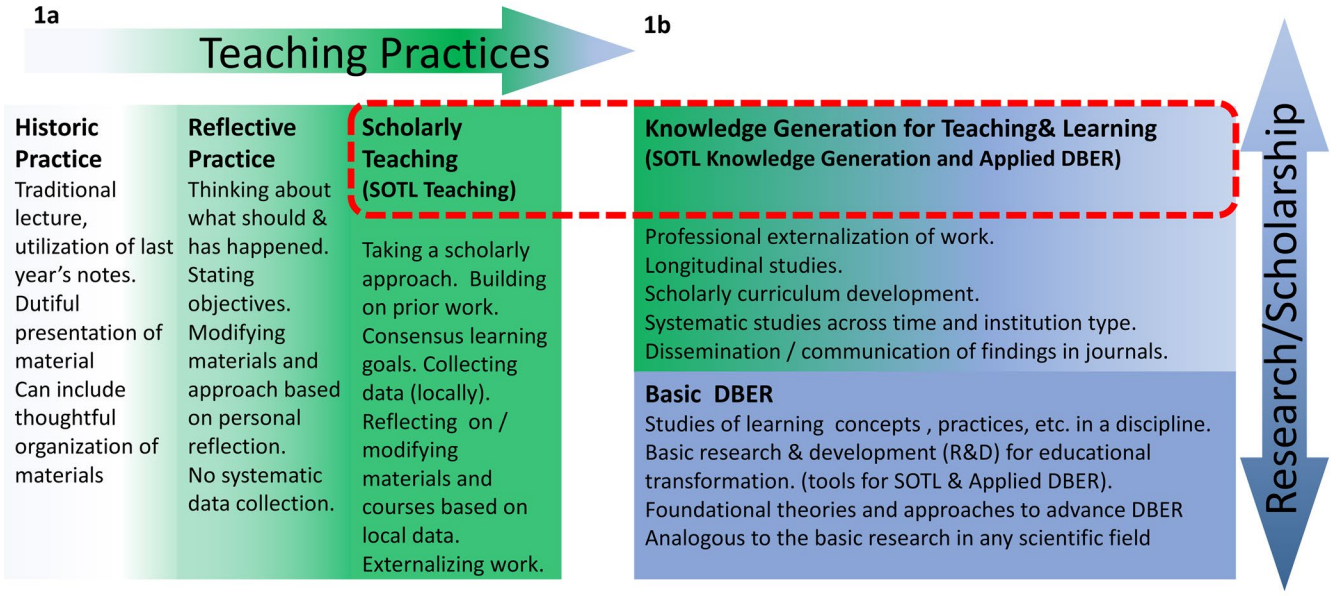
The DBER fields have yielded instrumental outcomes from basic to applied research, transformed many classroom practices, demonstrated improved pedagogical techniques, and even developed commercial materials for enhancing teaching and learning within the disciplines (NRC, 2012).

Clearly there is strong overlap between SOTL and DBER and the precise relationships have been the subject of a fair amount of discussion and debate over the years. One perspective is that DBER work has grown from within disciplinary fields to bring foundational scholarship from the learning sciences, psychology, cognitive sciences, and related fields into the disciplines; the applied side of this work has been to improve teaching. SOTL may be seen as approaching from the opposite direction—starting with teaching and growing into the disciplinary particulars and more foundational forms of learning. Early examples of these discussions can be found in Huber and Morreale (2002).

Distinguishing Teaching and Knowledge-Generation Duties

Given these understandings of DBER and SOTL, we consider the two traditional dimensions of teaching and research duties for faculty. In Figure 1a, on the left, there are a progression of teaching practices, and on the right (Figure 1b), various forms of research and scholarship focusing on teaching and learning practices.

Figure 1. Practices and Knowledge Generation Related to Teaching and Education



In Figure 1a we present a continuum of teaching practices applicable to all faculty, the horizontal directional arrow suggesting a hierarchy. The bidirectional vertical arrow in Figure 1b is a group of research and knowledge generation practices around education applicable to teaching professors and DBER faculty. These parallel the applied to foundational research practices of faculty in traditional fields. It is important to note the bidirectional arrow in Figure 1b suggests no hierarchy. As with all disciplines, research and scholarship span from basic to applied, and each is necessary.

Although somewhat reductionist, our categories help us both to highlight the continuum of teaching practices, from historic to scholarly, and to distinguish from more traditional research duties by recognizing the study of disciplinary teaching and learning as legitimate research. As Huber and Morreale (2002) argued, SOTL spans traditional teaching and research roles and is indicated in the red-dashed line of Figure 1a and 1b. However, to align with current structures, we distinguish the elements of SOTL as: (a) scholarship for teaching practices ("teaching practices") and (b) scholarship around knowledge generation/research on teaching practices ("research/scholarship").

Along the Teaching Practices dimension, we identify three scales of quality teaching practice (Figure 1a, to the left). *Historic Practice* is likely the most common form, enacting a theory of education that is associated with a transmission model, disseminating information. Commonly, such historical practice is embodied in lecture-based approaches with little data collection and no reflection on practice or modification based on students' engagement. *Reflective Practice* possesses many but not all of the elements of Scholarly Teaching. In particular, it is not systematic and more often based on personal data and opinions rather than collective views of the field and SOTL community.

Scholarly Teaching promotes a systematic approach to teaching and embodies the teaching practice elements of SOTL. Scholarly Teaching is characterized by faculty building on the prior work of others in SOTL and other education fields on how to teach a discipline, establishing or drawing from consensus on learning goals, collecting and acting on evidence through reflection, and externalizing this work in any number of ways (e.g., within a departmental learning community).

In research and scholarship that focuses on knowledge generation regarding teaching (Figure 1b), we identify two categories. First, *Knowledge Generation for Teaching & Learning* can blend the research and teaching practices—and may be the source of some confusion or overlap between SOTL and DBER. This category of scholarship is concerned with curriculum and pedagogical development and dissemination that are based on the application of more foundational work and scholarly studies over time. It represents the knowledge generating elements of SOTL and the applied side of DBER. It is committed to the professional

visibility of evidence-based work (e.g., through curriculum development and dissemination).

Second, *Basic DBER* is focused on the research enterprise of education within a discipline. It considers how people learn a given subject, the environments and conditions that affect students' learning, and the tools and practices that support or inhibit student learning. Investigations use evidence and argument that is accepted by the discipline and publicized often through peer review and journal publication. This work might be considered the basic research and development arm for curricula and pedagogical approaches that may be applied in SOTL. Basic DBER also considers foundational theories and approaches of learning, teaching, and environments within a field—for example, considering students' epistemological and ontological commitments in learning a domain (e.g., quantum physics).

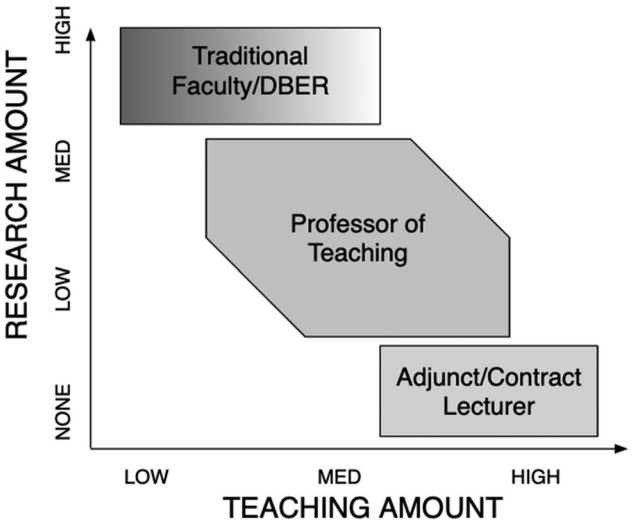
Allocation of Research and Teaching Duties Among Faculty: Expectations and Aspirations

Given these categorizations, the constructs can be used to consider the expectations of various faculty appointments, what counts as scholarship around knowledge generation, what counts as quality teaching practice, and how these vary by institutional, or even departmental, context.

Distinguishing between teaching and knowledge generation becomes especially useful when we disaggregate research and teaching expectations across the range of faculty roles that currently exist in higher education. The emergence of multiple instructional roles on our research-focused campuses has given rise to varied expectations with respect to research/scholarly activities that may accompany these roles (Figure 2).

As indicated in Figure 2, traditional and DBER faculty are, in general, expected to conduct medium to high amounts of research with low to medium amounts of teaching. Adjunct/contract lecturers, in general, have no research expectations with medium to high levels of teaching. Professors of teaching (and the broad array of full-time and permanent faculty focusing on instruction) have had the most varied expectations ranging from low to high teaching amounts, combined with low to

Figure 2. Expectations of Teaching and Research for the Various Instructional Roles.



medium amounts of research/scholarship. How these manifest in practice will vary.

Example: Teaching Faculty at the University of California

In the UC system, there are three roles with teaching responsibilities. UC Davis and UC Irvine, for example, both quarter-based systems, employ *adjunct/contract lecturers*, *professors of teaching*, and *traditional professors*. As a general rule, in most departments professors of teaching teach 50 to 75 percent more courses than traditional faculty and adjunct/contract lecturers 75 to 100 percent more than traditional faculty.

In terms of evaluation there is consensus that teaching constitutes 60 to 80 percent of a professor of teaching's time with "professional achievement and activity" occupying 10 to 20 percent and university and public service the remaining 10 to 20 percent. For traditional professors the teaching time and professional achievement and activity are reversed (focusing more on research), while for lecturers they are evaluated only on teaching.

Within this range of professional duties, the professors of teaching may experience additional challenges as they are expected to produce research outputs closer to the levels of traditional faculty while simultaneously having substantially higher teaching loads, often leading to an untenable set of expectations. Further complicating this scenario has been an overall confusion as to how to classify

and value scholarly activity that is connected to curricular innovation and experimentation.

Is This Scholarly Work Defined as Teaching or Research?

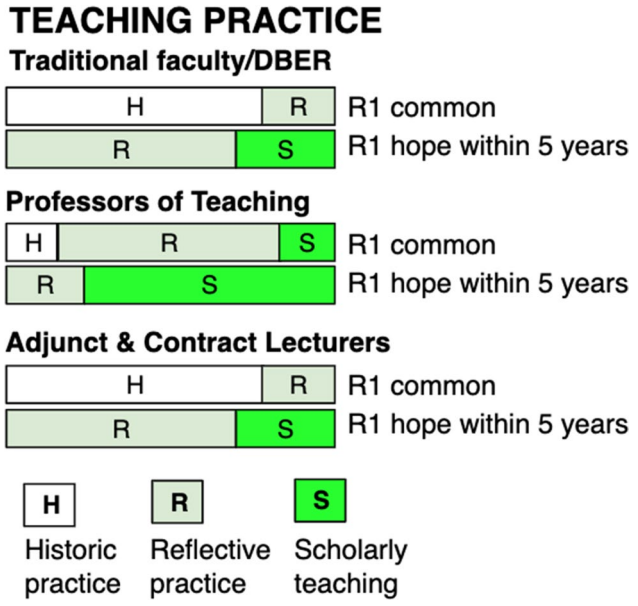
The UC system example situates the realities of combining teaching practices (Figure 1) and the amount of teaching (Figure 2). Traditional faculty, as well as adjunct lecturers, are similar in their teaching practices, often primarily engaged in *historic practice* with the emergence of *reflective practice*. What varies between the two positions is the expected teaching amounts. Professors of teaching, on the other hand, are expected to be more advanced in their teaching practices—exhibiting *reflective* and/or *scholarly teaching* behavior and engaging evidence-based best practices in their teaching while teaching at medium to high amounts. This distinction is represented in Figure 3. Both current and aspirational allocations of the various forms of teaching practice (from Figure 1) are shown for the different faculty roles.

Example: Faculty Who Teach Undergraduate Students at UNC Chapel Hill

The faculty that teach undergraduate students are either traditional faculty or contract faculty, including adjuncts, lecturers, and professors of teaching. On average, professors of teaching teach up to twice the number of courses that traditional faculty teach, class sizes are typically larger, and adjuncts vary depending on current needs in a department. Adjuncts are evaluated on teaching, professors of teaching on both teaching and service, and traditional faculty on teaching, service, and research. Departments vary in setting specific percent efforts or additional expectations. Of note, teaching innovation and transformation is often seeded by professors of teaching that engage in higher levels of scholarly teaching practices than the current norm shown for R1s (Figure 3).

Greater scrutiny from the public and accreditation bodies as well as the increasing expectations of student learning and job preparation for our research-intensive institutions are already pushing us to adopt/consider reflective and scholarly teaching practice as the norm in undergraduate teaching. We embrace this push and imagine a future in which *all*

Figure 3. Fraction of Faculty Engaging in Various Teaching Practices Today and Aspirations for the Future for Various Academic Roles



faculty—regardless of appointment—will abandon historic teaching practices for the more effective practices based in deep reflection and scholarly inquiry. As such, we seek to reframe the work of academics as scholarly, where excellence is applied to all activities, rather than treated as a fixed commodity doled out separately to our research, teaching, and service roles.

Common Standards and Explicit Expectations

We believe that what constitutes effective teaching and what evidence we consider when conducting an evaluation of a candidate's teaching effectiveness should be consistent across all professional roles on a campus. That is, the metrics and evidence used in defining and evaluating quality teaching should be the same for traditional faculty, professors of teaching, and lecturers. Figure 1a begins to define the degrees of quality for teaching practices. The amount of teaching responsibility and the minimum bar for quality will likely be different for different roles, but that should not alter how we define and reward effective teaching.

Based on decades of scholarship, we know that we can build on prior work in teaching a given subject, establish measurable learning outcomes,

evaluate these goals, and continuously improve. Whether a full-time instructional position teaching introductory physics or a quantum theorist teaching advanced-level quantum mechanics, those educating our students should enact these effective practices and be supported and rewarded in doing so. A variety of efforts are underway nationally to promote these practices by defining teaching quality (e.g., http://Teval.net and National Academies of Science Engineering and Medicine, 2020).

Similarly, research and scholarly activities around knowledge generation should be evaluated in a consistent manner across different professional roles. In the case of traditional research faculty and DBER faculty, the levels of research productivity and types of research (from basic to applied) will be consistent. Those engaged in discipline-based education research ought to be held to their field's disciplinary standards for knowledge generation and impact when it comes to considering their research contributions (Dolan et al., 2018).

The expectations of professors of teaching and related faculty roles may be where these categorical schemes (e.g., Figures 1, 2, and 3) become particularly helpful. In these instances, fixed frameworks for defining teaching practices and quality are necessary, and one might expect more "advanced" or "professional level" teaching achievements from teaching professors than traditional faculty (http://Teval.net).

Furthermore, institutions that hire faculty into teaching positions with some expectations of research (even if the percent allocation to research is less than research faculty) should value the scholarship and knowledge generation that is conducted through their SOTL or DBER work (Figure 1b). While we know there exist teaching professors who conduct research in traditional areas (e.g., nuclear or atomic physics), institutions will benefit from valuing the scholarly work that is conducted and validated through knowledge-generating SOTL and/or Applied DBER. No matter where an institution lands on discussion of what practices are valued for varying positions, these expectations need to be made explicit and the critical role of teaching needs to be valued.

Clarifying instructional and research expectations and aspirations for our faculty can help pave the way toward a more educationally productive experience for all.

We have provided a framework that considers teaching practices and knowledge generation as two critical activities of our instructional and research faculty at research-intensive institutions. Our hope is that the framework can encourage productive discussions around teaching and research expectations while promoting consistent measures applied across all relevant titles for teaching and research activities. Fortunately, to support these discussions, efforts are underway nationwide to reevaluate teaching effectiveness more holistically and transparently, and similar efforts in evaluating research/scholarly activities may also prove beneficial. These efforts will also help us respond to the greater scrutiny placed on higher education, the value it provides students, and how inclusive or exclusive it is. Clarifying instructional and research expectations and aspirations for our faculty can help pave the way toward a more educationally productive experience for all. C

We are grateful to scholars who have long studied higher education upon whom we draw. Thanks to the communities formed and the initiatives led by the Association of American Universities, the Association of Public and Land-Grant Universities, the BayView Alliance, and the Howard Hughes Medical Institute Inclusive Excellence program.

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