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REFLECTIONS ON HELPING STUDENTS LEARN

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# More or Less? What We Can Learn from Research on Teaching

Have you ever tried to look up research to solve a teaching and learning challenge in your classroom? While such "surgical strikes" in the research literature may be useful, they may not expose us to the profound implications this growing body of evidence has for our teaching practice.

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## Introduction

Whether you call it the Scholarship of Teaching and Learning (SoTL), discipline-based educational research (DBER), pedagogical research, teaching as research, or something else, all of these forms of teaching and learning scholarship share a common focus on enhancing our understanding of teaching and learning in higher education. As this emerging field passes the 25-year mark, it may be time to get acquainted (or re-acquainted) with current research, consider the bigger questions that scholars in the field are now asking, and determine what role this vibrant, incisive, and multi-faceted research might play in your ongoing work as a teacher-scholar.

Many assume that teaching and learning scholarship is intended primarily to provide practical information for college teachers. To some extent, this is true, as research in these areas can provide evidence to support best practices in the classroom. There are outstanding pieces that, for example, demonstrate the effectiveness of clickers, the utility of team-based learning, and the applicability of meta-cognitive strategies (Avargil, Lavi, & Dori, 2018; Martyn, 2007; Michaelsen & Sweet, 2011). That being said, if faculty (or university presidents) are looking for easy answers, the equivalent of tips or tricks, then this body of research will likely disappoint.

## Case 1: Before or after?

Let us consider a common faculty dilemma: your students keep bugging you to post your slides online, prior to class. If you were to consult the research literature, which of the following options do you think would be supported?

A. Post them online prior to class.

B. Post them online after class.

C. Don't post; students take notes by hand.

D. Don't post; students take notes using handouts with blanks.

E. Don't post; students take notes using their devices (e.g. laptop or tablet).

The answer may surprise you. A landmark study of 2014 indicates notetaking by hand leads to enhanced outcomes (Mueller & Oppenheimer, 2014). So, there's your answer. Or maybe not. Other studies indicate answer D is best, especially for highly technical fields (Felder& Brent, 2015). Still others point to E, especially for adult learners (Landrum, 2010). In an informal poll of faculty at my workshops, most do option A (online prior to class), and plan to continue, regardless of what the research says.

On one hand, this example seems to affirm the contention that this literature is too scattered to provide useful advice or support change in practice. On the other, we rarely look to research in our own disciplines for easy, universal or fixed answers.Why should teaching and learning scholarship be an exception? If this exercise has led you to evaluate your own practice, then, regardless of what you decide to do, your engagement with this literature has helped you to be a thoughtful and intentional practitioner. This is what good applied scholarship does.

## Case 2: To Study or Not?

Imagine a situation in which you first teach your students a module, and then test them on that subject matter, 30 days later.

If you were to sort students into groups according to study strategies (as below), which do you think would perform best?

A. Students who study for multiple hours the week before the examination.

B. Students who do not study at all.

C. Students who don't study at all but take a multiple-choice quiz immediately after learning the materials (30 days before the examination).

D. Student who do not study but answer a series of open-ended questions immediately after learning the materials (30 days before the examination).

Let's start with the good news. Based on the study in question, conducted in a large art history course (Butler & Roediger, 2007; Lang, 2018), students who studied did better than students who didn't. Notably however, students who did not study but simply answered a few open-ended questions immediately after the module (option D) outperformed all others. You read that right: students who did not crack a book performed better than students who studied diligently. Whoa.

### **TALES FROM REAL LIFE:** THE PRESIDENT PROVOKES A REACTION

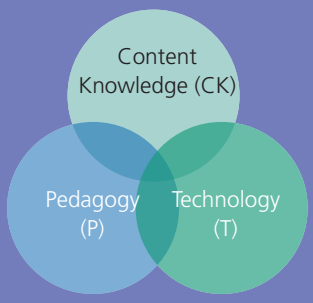
At a recent conference, I heard a university president point to the hundreds of journals on pedagogy in higher education and call them problematic. With that many options, he feared busy faculty can't stay abreast of evidence-based practice. He called for conference attendees, who included several hundred faculty, professional staff, and administrators, to rectify this state of affairs by developing a single source for effective teaching. His argument appeared to be persuasive, as evidenced by vigorous head nodding.

I, on the other hand, was flabbergasted. It seemed to me that his statement did a profound disservice to the rich body of research that continually captivates and inspires me. And I could not let it go. While my initial response to his remarks was defensive ("how dare he!"), I decided shortly thereafter to go on the offensive. After spending months reflecting deeply on the state of the field, I began to put together a case to persuade this president and others like him, why we should all be reading a wide range of this research on teaching and learning and why that matters now more than ever.

## **BEST PRACTICES:** YOUR PEDAGOGICAL CONTENT KNOWLEDGE (PCK)

Lee Shulman suggested that teaching and learning scholarship is intended to inform your pedagogical content knowledge, or the ways in which you blend what you know about your discipline (content knowledge, or CK) with what is known about teaching (pedagogy, or P). Later theorists added a third factor, the knowledge of how technology (T) could be used to enhance teaching and learning (TPCK).

How do you strengthen your TPCK? Here are a few suggestions to add to your current practice:




**OBSERVE:** Partner with colleagues to observe a range of teaching styles
- Recommended: Teaching Squares (where four faculty observe each other)

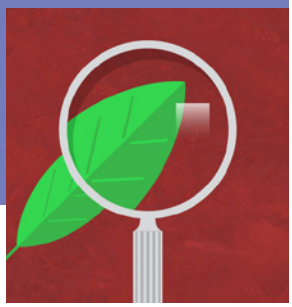
**INQUIRE:** Ask you students about how they learn in your class
- Recommended: Small Group Analysis (mid-semester student feedback)

**READ:** Choose a manageable amount of journals or books to stay up to date on the subject
- Recommended: James Lang, *Small Teaching*

**LISTEN:** Put on a Teaching and Learning Podcasts when you're driving or walking
- Recommended: *Teaching in Higher Education* (Bonnie Stachowiak)

**FOLLOW:** You can follow social media conversations by teaching thought leaders
- Recommended: @DerekBruff; derekbruff.org (Technology)

**SUBSCRIBE:** You can hear about current questions by following teaching listserves
- Recommended: *Tomorrow's Professor* (https://tomprof.stanford.edu/)



Why did those students outperform the others? How might this apply to your students? You may want to know more—perhaps much more—about this study and others like it. You also may have questions, or possible explanations, that the study does not answer or address. (How did those students study? What if you used different question types on the examination?)

What we have here, then, is a study about something you may not have known existed (retrieval practice), in a discipline (art history) that is most likely not your own, about a practice you may not do (examinations), at a university where you probably do not work. On surface, this may sound unappealing. However, I have found that this research engages faculty in constructive conversations, not just as teachers but as scholars. Put another way, while this study can't provide definitive answers, it does open lines of thought and inquiry.

## Case 3: Good to Great?

Our anonymous president (see "Tales from Real Life," on left) is not alone in suggesting that teaching and learning scholarship would benefit from consensus. Building consensus takes time, however. As our field just passed its 20-year mark, we can claim several paradigms. There does seem to be a preponderance of evidence, for example, that active learning works, higher-order thinking is preferable, online courses can be as effective as face-to-face instruction (but hybrid may be best), frequent formative feedback makes a difference, and so on. We hold these truths, and others like them, to be self-evident, though not to the point of intransigence in the face of as-yet unknown counter-evidence. Teachers and students are undeniably human, and their astonishing variety and variance is a source of continued vitality. That means that we cannot always bound the art and science of teaching (or learning) into hard and fast rules without enervating the very quality that draws many of us to this profession.

One last scenario: Bob the Biologist is considering a research project on his large lecture class, in which he has embraced active learning techniques. He asks you, his colleague: should he pursue this research?

Your response: _____

In this case, Bob's real name is Scott Freeman, and he and his colleagues published a seminal research study on active learning in STEM classrooms (Freeman et al, 2015). Their highly rigorous and large-scale study proved, as well as can be proven, that active learning strategies outperform straight lecture in large STEM courses. They did not, however, stop there. The authors contend the evidence was so conclusive that it could be considered a breach of responsible, even ethical professional conduct for faculty to continue to lecture.

When I present this study, I've had a few "hallelujahs" but more often I get faculty who respond very negatively.

If the study's purpose is, as many assume, to shame people into adopting active learning, then I would argue it has failed. Rather, I would suggest the primary purpose is not to change practice but to provoke. The implication is that we have accumulated a body of evidence about teaching and learning that is growing larger and also more incisive and insightful. We must consider our ethical responsibilities *vis a vis* this body of knowledge. While their research may be on active learning, their conclusions have changed the entire conversation about teaching. That, I believe, is the hallmark of not just good, but great scholarship. And I think our friend the college president might even agree we need more, not less of that.

### ADDITIONAL RESOURCES

Interested in teaching and learning scholarship from different disciplines? A magic list of (fully searchable) journals in teaching and learning available is here (https://cetl.kennesaw.edu/teaching-journals-directory).

To get a sense of the range of scholarship out there, consider perusing the following:

*Pedagogy.* This reflective journal about teaching writing resonates with aspects of teaching and learning. dukeupress.edu/pedagogy

*Journal on Excellence in College Teaching.* This multi-disciplinary journal covers a range of teaching practice. celt.miamioh.edu/ject/

*Journal of Chemical Education.* You don't have to be in a chemist to benefit from studies that lay bare the mechanisms of teaching and learning. pubs.acs.org/journal/jceda8

*Innovative Higher Education:* As the title suggests, this journal explores innovative and transformative higher education practices. link.springer.com/journal/10755

*Teaching and Learning Inquiry:* Affiliated with the International Society for the Scholarship of Teaching and Learning, this journal reveals where the field is heading. tlijournal.com/

And, of course, you already know about one great source—this one, *Thriving in Academe.*

Please note many outstanding journals do not appear on this list.

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## Meet Laura Cruz

My name is **Laura Cruz** and I serve as an associate research professor of Teaching & Learning Scholarship with the Schreyer Institute for Teaching Excellence at Pennsylvania State University. I never thought I would end up here. I started my academic career as a tenured professor of European history (Ph.D., University of California, Berkeley, 2001), but found myself drawn to questions of how and why we teach in higher education. That curiosity led to teaching awards, speaking engagements, teaching fellow appointments, editorships, scholarship, more scholarship, leadership roles, new institutions, culminating with my current position (and this article).

## ISSUES TO CONSIDER: GETTING STARTED

Let's assume I've convinced you to read more of teaching and learning scholarship. Here are answers to some questions that I frequently hear from faculty.

**How can I find interesting and relevant articles in teaching and learning scholarship?**

Mount Royal University librariarn Margy MacMillan suggests the same strategies that you might instruct students to use (Chick, 2018). These include keyword searching, following breadcrumbs (i.e. tracking citations in articles you have already read), and, of course, asking a librarian.

In my workshops, I often joke there is no "PubED." You can find teaching-related articles in many disciplinary-focused databases, but the best place to start may be the popular student source—Google Scholar. Because of the field's commitment to inclusion, many scholarship of teaching and learning (SoTL) journals are open access.

**How can I discern good scholarship in the field?**

As the field has matured, so have its quality standards and ability to integrate standards into practice. Most teaching and learning scholarship published today meets or exceeds these standards. Because teaching and learning scholarship is multi-disciplinary, you also can expect it to meet standards within respective fields.

**How can I relate to research that seems so different from my discipline?**

There is a common misconception that teaching and learning research is primarily based on quantitative social science research methods. Learning sciences aren't the only voice. Rest assured that scholarship is being done not only about teaching and learning in your field, but also that your research methods are asking and answering questions. Because teaching is itself a multi-disciplinary endeavor, so is research on teaching.