Thriving in Academe

REFLECTIONS ON HELPING STUDENTS LEARN

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Wise Instructional Choices in an Evidence-driven Era

Everywhere you turn, colleagues are talking about evidence-based teaching. But even when the evidence is convincing, it can be tough to choose a strategy and begin using it well. This navigational guide will help you get started.

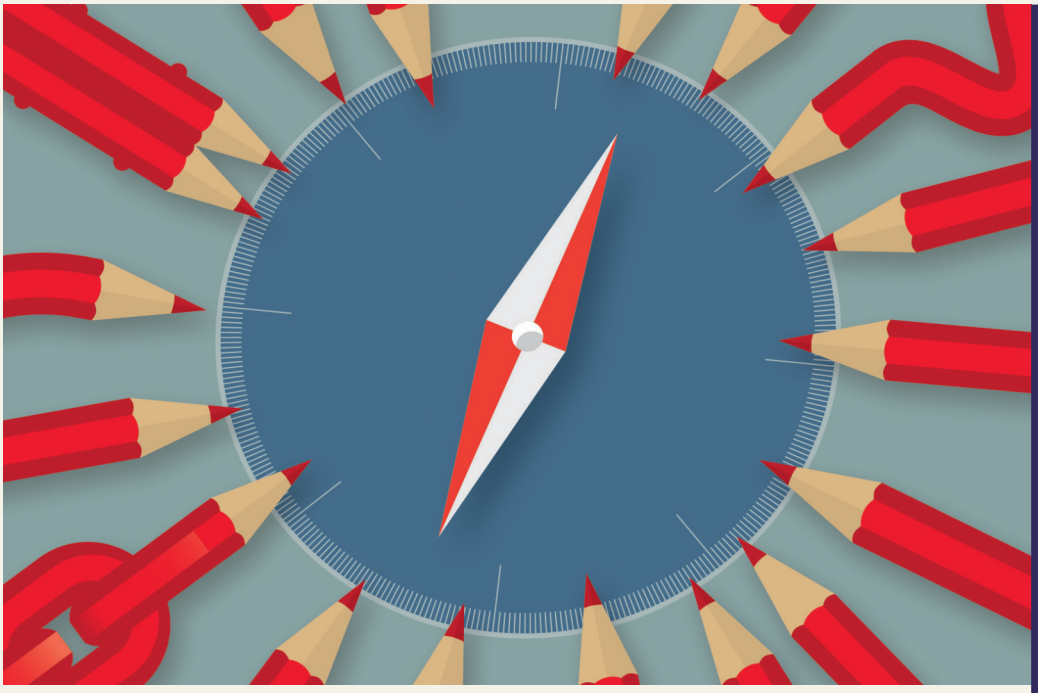
BY CASSANDRA VOLPE HORII
California Institute of Technology

It's true—we have an unprecedented body of evidence about effective college-level teaching. A wide range of techniques, focusing on active learning, lure with catchy titles and clever acronyms: Think-Pair-Share, JiTT (Just in Time Teaching), Peer Instruction, POGIL (Process-oriented Guided Inquiry Learning), and Flipped Classrooms, to name a few.

We all care about our students and want them to learn. Across disciplines, but especially in science, technology, engineering, and mathematics (STEM) fields, institutions are undertaking strategic initiatives, course redesigns, and curriculum transformation projects with evidence-based instructional strategies at their core.

Whether your motivation stems from curiosity, a desire to help students, participation in an institutional initiative, or some combination, navigating the available practices and strategies can be overwhelming. How do you choose? What lies between choosing and implementing? And, what can do you do if your chosen strategy doesn't seem to work?

Here's your chance to step back from the alphabet soup of methods and answer the underlying questions that will help you make wise instructional choices that take into account your teaching context, authenticity, and interests. The following pages will guide you through key steps toward navigating the terrain of evidence-based teaching.



Your Instructional GPS

You wouldn't set out on a road trip without taking your GPS-enabled device. In our classrooms, we also need navigational assistance. When it comes to evidence-based teaching, our internal compasses may not be as reliable as we think.

The sections that follow here will help you develop your instructional GPS. Rather than dictate methods to use (see Resources for suggested approaches), this sequence will help you evaluate teaching methods and decide what to use and how to use it.

Research about adoption of evidence-based teaching suggests most faculty are familiar with such techniques and may be convinced they're worth trying, but long-term implementation lags behind. To make these techniques something you can see yourself doing and that you are willing to stick with, it helps to prepare as follows.

Foundational questions

In your own discipline, you have go-to questions that you instinctively run through when faced with a new artifact, problem, text, or piece of evidence. You likely developed your processes through intensive study, exposure to many examples, and a great deal of practice. You can develop your reflexes for productive questioning of evidence-based teaching methods, too.

Meet Author

Cassandra Volpe Horii (cvh@caltech.edu) is the founding director of the Center for Teaching, Learning, and Outreach at the California Institute of Technology and the current president of the POD Network in Higher Education. With a background in physics and atmospheric science, she has focused on the research and practice of educational development—improving teaching and learning through faculty development, course and curriculum development, and organizational development—for over 15 years. Her research interests include preparing future faculty as mentors of undergraduate research, organizational structures in support of systemic educational change, and innovative instructional consultation methods. She is active in several national STEM education efforts and has taught courses in STEM pedagogy, sustainability, expository writing, and atmospheric chemistry.

TALES FROM REAL LIFE > GO FOR AUTHENTICITY

Over the past decades, I've seen our collective approach to university teaching transform from one based on private wisdom to one where teaching practices are routinely studied and discussed. I've also seen the volume of findings become almost paralyzing for some instructors. Others feel compelled to adopt certain practices, even with a strong underlying sense of antipathy. Ultimately, I've concluded that, while we need good evidence, we must realize that teaching is more than can be summarized in any chart. Evidence-based pedagogies are enacted via human instructors, in relationship with students—all with unique personalities, interests, passions, and aspirations. The teacher, as an authentic, individual human being, matters very much.

I now encourage instructors to pick methods that will enable their best expression of enthusiasm and authenticity with students. Methods vary in the amount of lecture, the types of interactions with students, the amount and kind of preparation, and the distribution of your time. Ideally, you should feel like yourself in the classroom. I believe that the more you choose evidence-based methods that feel meaningful and compatible, the more effective, enjoyable, and sustainable teaching will be.

Q1: WHY USE THIS METHOD?

Evidence-based methods are often presented with research that shows impressive results, including demonstrable gains in student learning; extra benefits for first-generation and underrepresented students; improvements in attitudes toward the subject matter; or improved academic persistence and success. Most such methods are based on types of active learning—the deliberate, guided engagement of all students in some form of dynamic reasoning, discussing, creating, or processing. However, without further reflection, it is not always clear what kinds of learning a technique is best suited for and whether it aligns with your context and goals.

For example, let's say evidence-based method A involves students working in pairs on conceptual questions for a few minutes, while B has them working in teams of four for 20 to 30 minutes.

Method A comes with several special affordances, or "why use this" attributes. These include engaging every single student, getting students to practice articulating their reasoning, and giving the instructor a natural segue back into whole-class engagement, such as elaboration, explanation, and synthesis by the instructor. Method A is also feasible in any seating arrangement.

Method B, on the other hand, with its extended interaction and larger group structure, provides practice in teamwork and flexibility within groups. It more readily allows for engagement with complex issues and multi-step reasoning. It works best if students can see each other, sitting around a shared workspace. So depending on your space and goals—especially whether collaboration skills and in-depth analysis are important for your course or discipline—method B may be a better match.

As you encounter new methods and ask "why use this?" consider what the method makes possible and how it matches the goals you have for student learning.

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Q2: WHAT ASPECTS ARE ESSENTIAL?

Evidence-based practices often can look like faits accomplis—not surprisingly because those people writing about them have been through implementation and want to share the finished product. That means they may appear as all-or-nothing packages, perhaps with an end point so far from your current ways of teaching that it's difficult to see how you would get there.

Keeping a critical eye on the essential elements can help you maintain a mindset of incremental adoption. In fact, experts maintain that integrating new methods a little at a time into your teaching is both more realistic and more sustainable. It also allows you to build on a strong foundation.

Some researchers are now starting to think about, and advocate for, the concept of fidelity of adoption with respect to evidence-based pedagogies. That is, in order to maintain the effectiveness of the method, we need to separate out the features that are essential from the ones that happen to be along for the ride or are unique to a certain place or instructor.

You can also look for the minimum increment for any technique—i.e., while maintaining its fidelity, does this method require a minimum of five minutes per class, or 20? To affect student learning, do you need to repeat it every class or once a week? Again, this approach supports realistic adoption and enables you to match a technique's smallest effective dose with a portion of your class.

Context matters

Let's acknowledge the reality of higher education today—our contexts differ widely, and what is possible in one setting may be unreasonable elsewhere. This includes the expectations you face in your instructional role, whether those involve a heavy research commitment, a high course load, a wide variety of course preps, advising duties,

BEST PRACTICES > REUSE AND EXPLAIN

Two pitfalls—reinventing the wheel and jumping in without setting student expectations—have the potential to derail evidence-based teaching methods. Here's how you can avoid them. First, set aside the belief that all of your teaching materials need to be original. In teaching, you can and should use what others have already developed and tested. See the Resources section for suitable materials; ask colleagues for more (they likely will be flattered); and draw on published collections of classroom activities. Ask to visit colleagues' classes and watch them in action. Use video examples, such as Instructional Moves (see Resources), to see a wider range of classroom cases than are available on your own campus. Second, explain the method to students. Tell them what you're doing, why it will help them learn and succeed, and how they are expected to participate. Since evidence-based methods may represent a change for students, too—new study habits, new behaviors in class, new expectations all around—a clear and enthusiastic explanation is essential. Then, revisit the what, why, and how with students periodically. Be sure to point out when they succeed, how they can improve, and when you see a positive difference in their learning.

service on committees, or teaching in multiple departments, programs, or institutions.

As you enter any changes, it's helpful to consider the constraints and possibilities of your context. For example, if you're juggling multiple course preps, you might choose a teaching method that is flexible enough to work in all of your classes. If you're teaching on multiple campuses with different technology systems, choosing something low-tech and transportable may be your best bet.

Use all available resources: instructional support staff, faculty development programs, course redesign workshops, technology assistance, peer mentors, release time, and grants. If you cannot find such support, the concept of minimum increment is even more important, and techniques that save you time while helping students learn are worth examining.

With a variety of options available, choose evidence-based methods and implementation timelines that are in sync, not at odds, with your identity and context.

KEEPING A CRITICAL EYE ON **THE ESSENTIAL ELEMENTS** CAN HELP YOU MAINTAIN A MINDSET OF INCREMENTAL ADOPTION.

ISSUES TO CONSIDER

LAY THE GROUNDWORK

When your instructional GPS is activated, these "what ifs" are less likely to be problems. Here are some additional tips.

What if my course evaluations suffer? First, don't assume they will! If you're making small changes, using tested materials, and explaining the method clearly to students, course evaluations are likely to hold steady or improve.

A proactive step you can take is to get early feedback. Two or three weeks into class, have students fill out an anonymous survey about their experience in the course. It's useful to phrase the questions in terms of learning, rather than satisfaction—the Student Assessment of Learning Gains (SALG) survey has examples you can use or adapt. Open-ended questions can also give you a sense of their perceived successes, areas of confusion, and practical ways to help. Teaching centers offer expert class observations, feedback-oriented student focus groups, and assistance interpreting survey results. Early feedback will help you make adjustments and address points of student confusion.

If course evaluations are especially high stakes on your campus, you may want to talk with your chair or dean ahead of time. Let them know your plans, how the method you've chosen can support students, how it connects with institutional goals, and your commitment to getting feedback. Knowing that your chair or dean has your back can help allay your fears and open up a positive dialogue about teaching.

What if it doesn't work? First you need to think about how you will know if it does work. Be realistic. If you're implementing small changes, you may not see dramatic learning gains at first. You can hold certain assessments stable from one term to another to have a comparison point. Pre/post tests and surveys capturing student attitudes may also be useful. Consider qualitative changes too—classroom community, teamwork, overall engagement. Give yourself just a few meaningful data points. This approach will keep you from jumping to conclusions based on limited student feedback or a few non-optimal outcomes, as well as diagnose what to tweak if you need to make adjustments.

Finally, be kind to yourself and keep the big picture in view. If something goes wrong, maintain your sense of humor, explain to students what happened, make a change, and try again. Maybe you've given students the wise advice that failure is part of learning. As it turns out, that same advice applies to evidence-based teaching.

REFERENCES AND RESOURCES

Resources marked * contain extensive materials from a variety of disciplines.

Beuning, P., Besson, D., & Snyder, S. (2014). *Teach Better, Save Time, and Have More Fun: A Guide to Teaching and Mentoring in Science.* Tucson, AZ: Research Corporation for Science Advancement. http://rescorp.org/gdresources/uploads/files/publications/RCSA-Teach-Better-Book.pdf

Brownwell, S. & Tanner, K. (2012). Barriers to Faculty Pedagogical Change: Lack of Training, Time, Incentives, and…Tensions with Professional Identity? *CBE—Life Sciences Education*, 11(4), 339–346.

*Carl Wieman Science Education Initiative at the University of British Columbia, http://cwsei.ubc.ca/.

Cavanagh, A., Aragón, O., Chen, X., Couch, B., Durham, M. Bobrownicki, A., Hanauer, D., & Graham, M (2016). Student Buy-In to Active Learning in a College Science Course. *CBE—Life Sciences Education*, 15(76), 1–9.

Eagan, M., Stolzenberg, E., Berdan Lozano, J., Aragon, M., Suchard M., & Hurtado, S. (2014). *Undergraduate teaching faculty: The 2013–2014 HERI Faculty Survey*. Los Angeles: Higher Education Research Institute, UCLA.

*Instructional Moves, https://instructionalmoves.gse.harvard.edu/. Features a wide range of academic disciplines, including the humanities and social sciences.

*Mathematical Association of America (2017). *Instructional Practices Guide*. https://www.maa.org/programs-and-communities/curriculum%20resources/instructional-practices-guide

*National Research Council (2015). *Reaching Students: What Research Says About Effective Instruction in Undergraduate Science and Engineering*. Washington, DC: The National Academies Press. https://www.nap.edu/catalog/18687/reaching-students-what-research-says-about-effective-instruction-in-undergraduate

O'Meara, K., LaPointe Terosky, A., & Neumann, A. (2009). Faculty Careers and Work Lives: A Professional Growth Perspective. *ASHE Higher Education Report*, 34(3).

*PhysPort: Supporting physics teaching with research-based resources. https://www.physport.org/

Student Assessment of their Learning Gains (SALG) instrument. https://salgsite.net.

*Science Education Resource Center at Carleton College, Higher Education Portal, https://serc.carleton.edu/highered/index.html.

Winkelmes, M., Bernacki, M., Butler, J., Zochowski, M., Golanics, J., & Harriss Weavil, K. (2016). A Teaching Intervention that Increases Underserved College Students' Success. Peer Review, 18(1/2).