A PRACTICAL REVIEW OF A PRACTICAL BOOK*

by D. Shah

If you teach STEM courses in higher ed, Felder and Brent's *Teaching and Learning STEM: A Practical Guide* is worth checking out. It's essentially a one-stop shop for what you need to know to design and teach a course, answers to common teaching questions, and citations of the relevant teaching and learning literature. It's very skimmable and written in easy-to-read language. It covers topics such as writing learning objectives, planning for your class/lab sessions, active learning, ed tech, and how to help your students develop professional skills. Information on neuroscience and the science of learning is sprinkled throughout in sections called "Brainwaves".

Felder and Brent have been writing about chemical engineering education and STEM education for years, kindly making their articles and resources available online. The book provides structure and organization to that work, allowing instructors and faculty to more easily find the answers to their questions.

The book is not a comprehensive literature review on all of these topics – if it was, it would NOT be a practical read for faculty. So, if you are looking for an exhaustive review of the literature supporting the use of worked examples, for instance, don't look here. But, if you didn't know that there are research-based recommendations for how to implement worked examples in class, you'll learn about them in this book.

A small sampling of tips from the book that are, well, practical and good to consider at the beginning of the term:

- *"If you assign 50 pages of reading of which five directly relate to your objectives…don't be surprised if the students ignore the assignment."*
  If you want your students to read, make the readings tailored to what they really need to know. Remember, undergrads are taking many other courses and have to figure out how to manage their workload. If the "readings" on the syllabus are simply the corresponding chapter that happens to mention the concept being discussed in class, plus a lot of other stuff that may or may not be important, they will stop doing the readings. If you tailor the readings, avoid lecturing on the exact same material, and ask students to call upon the material that they were supposed to have read through class discussion or problem solving, it will send the message that the readings are important.
- *"…minimize and possibly even eliminate student resistance to active learning by taking a little time on the first day of class to explain what you'll be doing, why you'll be doing it, and what's in it for the students."*
  Remember, many of your students may be used to classes that are 100% lecture and may not know there is real evidence to show that active methods enhance learning.
- *"Don't try flipping until you're comfortable with active learning and know how to deal with student resistance to it."*
  Remember, the idea of the flipped classroom is to move most of the content delivery to

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* *MIT Cog Blog: Thoughts and Opinions from the MIT Teaching and Learning Lab*, August 30, 2016.

outside-of-class time and have more time in class for practice and discussion. So, get comfortable with making your class sessions interactive first. It's easy to get really excited about flipping your class, but it can be a lot to undertake at once. If your goal is to flip your entire course, Felder & Brent recommend, and I agree, that you consider flipping a module/unit of your course first and work your way up.

If you are an alumnus of TLL's Kaufman Teaching Certificate Program and are wondering if you should check out this book, I say, "yes." The program addressed many of the ideas discussed in the book, but there are definitely additional topics in the book that we did not have time to cover in the program. TLL has a copy in our library, if you want to stop by and check it out.

If you are a teaching and learning professional at a university or college teaching and learning center, you are probably already familiar with everything in the book and will find yourself nodding your head "yes, uh-huh" as you read through it. It's a good book to know about, because it might be a good resource for new faculty seeking resources from your center.

Disclaimer: This may be a slightly biased review. Rich Felder taught the first two chemical engineering courses I took as an undergraduate student at NCSU (it was a good experience).