

Foreword

For many university professors, teaching is like being handed the keys to a car without being taught how to drive. The result? Even experienced professors can wind up driving with their pedagogical parking brakes on. They steer forward clumsily, unaware that there's an easier way, and ignoring the smoke emerging from the tailpipe.

This book is hands-down the best instruction manual for professors in science, technology, engineering, and mathematics that you can find. Husband-and-wife team Richard Felder and Rebecca Brent write in an exceptionally clear, non-stuffy voice that makes this a book you can read even at the end of a busy day. A simple glance at the table of contents or index will rapidly take you to what you might need to find at the moment—either before or after you've read the whole book.

The book is packed with special features, which include brief “interlude” essays that give you a sense of what your students are thinking; succinct summaries of key practical insights from neuroscience; and concrete suggestions based on solid research and decades of experience. Everything is backed with loads of references, so you can easily explore as deeply as you choose.

Books on teaching in the STEM disciplines often center on one discipline—physics, say, or engineering. Few comprehensively encompass teaching in STEM fields ranging from biology and chemistry to theoretical mathematics. This book takes a broad-ranging approach that allows readers to pluck the best insights from a wide variety of STEM disciplines.

And it's a great thing—there's never been a stronger need for a book that lays out the foundations of good teaching at university levels in the STEM disciplines. Worldwide, STEM jobs are like mushrooms—popping up at far higher rates than many other types of jobs, yet not enough candidates for these jobs are graduating from our STEM programs. In fact, often only a small percentage of high school seniors are interested in pursuing STEM careers. Many of those students fall by the wayside as they bump against the challenges of STEM studies.

But as Richard Felder and Rebecca Brent lay out in this remarkably engaging book, there are ways to work smarter as instructors—ways to help improve students' desire and ability to master tough material. This book can help you open important career opportunities for your students, even as you help improve and increase their skill sets that address profound national and international needs. You will also find that releasing the parking brake of less-than-adequate teaching will make your life as a professor more fulfilling and enjoyable.

Learner-centered approaches go all the way back to the Greeks, the Buddha, and various traditions of the Far East, and have recently been taken up again in the STEM disciplines by expert teachers and researchers such as mathematician Robert Lee Moore and physicists Eric Mazur and Carl Wieman. There is a reason for the continued popularity of learner-centered teaching techniques by the best and most famous teachers: such approaches do much to stimulate student success. This book contains up-to-date practical information about how to apply these techniques in the STEM disciplines.

On a personal note, I first met Rich and Rebecca at the very beginning of my teaching career. I was lucky enough to attend a workshop they taught on “learner-centered teaching,”

which is the pedagogical framework of their book. That workshop changed the whole focus of my teaching and allowed me to understand learning in a whole new, deeper way. You'll find that your own understanding of learning will be greatly enriched as you read this extraordinary book.

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Author of *New York Times* best-selling book *A Mind for Numbers: How to Excel in Math and Science (Even If You Flunked Algebra)*, and co-instructor of *Learning How to Learn: Powerful Mental Tools to Help You Master Tough Subjects*, one of the world's largest Massive Open Online Courses, for Coursera-UC San Diego.