Grrr … the Textbook Screwed Up Again!

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No textbook is perfect. Each one contains a range of errors, from minor printing typos all the way up to major conceptual mistakes. In my experience, instructors respond to the presence of errors in books in different ways.

Some teachers feel strongly that the existence of errors is a big deal and that they are ethically bound to alert students to every one of them that occurs in the sections of the textbook they assign to students. Such instructors are also likely to grous about the errors to department textbook selection committees, either in reference to a particular title or more generally that “all books in the field are hopeless” and so they cannot support any of the books under consideration. Personally I find this attitude to be unhelpful. There’s no need to throw the baby out with the bathwater and condemn the entirety of a text just because it has errors in it (unless the kind and number of errors is really egregious). Furthermore, while it can be helpful to selectively point out some errors to students to prevent them from succumbing to confusion or misconceptions, it takes a great deal of class time to do so. The students first have to find the page and line in the book that the professor is objecting to; then an explanation has to be elaborated about exactly what’s wrong and why; and finally a correction has to be provided and perhaps inserted into the text by all the students. If instructors do that often, they should not be surprised if students complain in their end-of-course evaluations that “the professor knowingly adopted a textbook riddled with errors.” Students are also likely to conclude that “if the book has these many issues then probably I cannot trust anything in it” and leave the course with the impression that physics is a confused and error-prone subject where even expert authors cannot figure things out.

Partly in reaction to these issues, some faculty respond by not adopting any course textbook at all (or ignoring the one the department may require all students in a given course to purchase). They instead develop and use only their own notes and slides. Now, there are many good reasons for writing one’s own material, but it would be the height of arrogance to assert that such self-prepared items are less error-prone than a textbook from a reputable pub-
lisher that has been illustrated professionally and peer-reviewed’ by a large number of proofreaders and class testers. In addition, I would strongly discourage most faculty from investing the substantial time it would take to prepare all of their own materials from scratch. Yes, by all means, develop some of your own supplements such as worksheets, and edit slides obtained from others to suit your classroom needs. But I do not recommend attempting to write a whole course worth of stuff entirely on your own!

I advocate for a middle ground—that of adopting a textbook, orienting one’s course syllabus around that book, and not getting bent out of shape by the errors in it. Fortunately this approach remains a common way that physics courses are taught today, and I believe most instructors are making a good choice in doing so. I have a few additional thoughts. Recommending (or worse, requiring) other textbooks beyond a single primary one is seldom fruitful. Books are expensive and it already is asking a lot of students to read one carefully. Perhaps in an upper-level honors seminar it might be appropriate to recommend some books that motivated students might want to add to their library, but not in every course. I also suggest the book should be an officially published one (self-publishing is probably okay) rather than a photocopied set of notes which lacks an index and cannot be cited. I occasionally had professors use such bound notes in classes when I was a student, and I must say I remember little from those notes and never find it easy to look back at them to find things. At the same time, while sticking to one text per course, I usually like to change books when I teach a course the next time. I understand that many instructors object that there is a substantial preparation time involved in preparing notes and slides that tie directly to the text, and the like. But on the other hand, there are many benefits to changing textbook. You become exposed to alternative ways of presenting a topic. You remember what it’s like for students who are trying to keep up with new text readings and homework assignments. But maybe most importantly, I think it’s less boring as a teacher to dive into a new book rather than rehashing all the stuff you did last time. Plus it models an approach of lifelong learning for students, demonstrating that we instructors humbly admit we need to keep fresh in a subject. Unless we teachers are reading a textbook daily, why should we expect students to do so?

Finally, what can we educators do about textbook errors? First, as we read texts, we can make notes and corrections in the margins. Encourage students to do likewise. We can gradually improve our teaching, they can improve their learning, and we can all grow in our understanding. Such marginal notes need not be shared with anyone else to be beneficial. Second, one could develop activities and discussions specifically geared toward analyzing and correcting selected textbook errors in class. Although I have not tried to make some kind of class game or competition out of it, that does seem a potentially fun way to teach students to maintain a discerning attitude toward texts. Third, faculty can write articles in educational journals that encourage alternative ways to think about and explore a topic. Disparaging letters to authors and publishers about errors in their books are less effective than positively presenting new and better ways to teach things. Fourth, if a homework or example problem that is directly relevant to the course has a significant error in it, by all means it should be pointed out to students. I suggest doing so in an email (rather than wasting class time in oral remarks that will probably go in one ear and out the other) or, better yet, directly in the homework instructions. But do so concisely, clearly, and unapologetically. Avoid criticizing textbooks by name around students or colleagues—it just makes one look like an irascible complainer. Fifth, don’t become obsessed by a vain attempt to never say anything wrong in class. It leads to a cautious and boring teaching style in which every statement is qualified. Enjoy your chance to make bold pronouncements now and then! Remember that learning is a spiral process and that students are not going to be damaged by a few mistakes. They are unlikely to remember any of those details you belabored to get “just right.” In the end, just as you can identify errors by thoughtful reading, so students are not doomed to permanent ignorance by them, provided we don’t just hand them fish but instead teach them to fish.

Carl Mungan is completing his 24th consecutive year of teaching undergraduate physics courses. Although he enjoys thinking about, reading, and writing (short) pieces related to physics education, he has not to date seriously entertained the notion of writing a textbook. He believes that that job is reserved for educators who are specially gifted and dedicated to doing so and it should not be the ambition of most physics faculty.

[1] Textbooks are not going away any time soon, for reasons discussed at <theconversation.com/ despite-predictions-of-their-demise-college-textbooks-arent-going-away-99931>.
[4] “That’s the way all the books were: They said things that were useless, mixed-up, ambiguous, confusing, and partially incorrect. How anybody can learn science from these books, I don’t know, because it’s not science.” R.P. Feynman, “Judging Books by Their Covers” in Surely You’re Joking, My Feynman! (Bantam Books, NY, 1985), p. 271.
[5] I am reminded of the story that one does not learn to identify counterfeit money by studying forgeries. After all, there is an infinite variety of possible errors and weaknesses in fake bills. Instead, one should become so familiar with real money that one begins to intuitively sense an error because of its contrast. In the classroom, it is better to
spend student’s time in learning what is helpful and correct than to wallow unduly in the mud of misconceptions and errors, as suggested at <phys-l.org/archives/2011/9_2011/msg00232.html>.


[7] Some faculty argue that such peer review makes textbooks worse not better, because it forces them to hew to conventional explanations and commonly accepted viewpoints. I do not fully agree. Without a common corpus we would eventually descend into chaos in the curriculum, where what one teacher asserts in a course might be explicitly contradicted by what another instructor professes in a follow-on course. I grant that textbooks copy ideas and figures from each other, and thus some weak styles of presentation and even flat-out misconceptions get propagated. Yet I maintain faith that the community of physics educators will eventually iron out these points in future books. The evolution in textbook writing may be slow and even exhibit occasional regressions, but on the whole I think we can all learn a lot by reading books and pedagogical articles rather than dismissing them as “same old, same old.” For other points of view, read C. Bohren, “Physics textbook writing: Medieval, monastic mimicry,” APS Forum on Education Newsletter (Summer 2008), p. 5 and two more letters entitled “Textbook errors” in Phys. Educ. 2, 171 (1967) and 4, 60 (1969).
