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How to Teach What You Don't Actually Know

Katherine Streeter for The Chronicle

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By Therese Huston

Zach is a tenure-track professor at a small liberal-arts college. He teaches chemistry and cares deeply about teaching it well, so he volunteered to teach a new course for freshmen to draw more students into the sciences. It's called "The Chemistry and Biology of Fat." But Zach doesn't know a whole semester's worth of material about fat. His expertise is in proteins.

Codrina also teaches chemistry. But she has been assigned to teach a first-year writing seminar and has found herself teaching the Declaration of Independence and reading slave narratives.

Then there's Andy, an adjunct instructor in education who is about to start his second year at a large state university. The department chair asked him to teach, "Research Design and Statistics." To be a team player, Andy agreed, even though he's never used half the methods in the textbook.

Zach, Codrina, and Andy aren't alone. Faculty members often find themselves having to teach what they don't know. I have formally interviewed 28 faculty members and administrators and discussed the idea with many others. And I have found that teaching what you don't know isn't the lonely plight of the newly hired Ph.D. but a common dilemma for faculty members at all stages of their careers.

If you've just been assigned to teach a course that is outside your specialty, what are some survival strategies? How can you teach well enough that students learn something valuable, and also manage your time well enough to stay sane? Based on my research, the following steps may be helpful:

Consider the principle of backward design. Begin with the end product first: What do you want students to be able to do as a result of learning in your course? Then outline the kinds of evidence that will be acceptable. Finally, decide what you need to do, and what students need to

do, to produce that kind of evidence. What materials will students need? What strategic advice or background information should you provide, and what kind of practice will they need?

That approach differs from the way most of us design our courses. We usually outline the readings first and then figure out how many homework assignments or exams to give. Then, somewhere near the middle or the end of the process, we draft language about what we want students to know—which inevitably leads to squeezing in some additional readings or assignments.

I've done that many times myself, but that approach doesn't focus on academic purpose. Basically it's designed to fill the calendar. You'll achieve that, but in doing so you'll commit yourself to covering all that content—some or all of which you don't know—without more meaningful learning goals in mind.

Focus on asking the right questions. Many instructors try to begin with questions that will be compelling to students. But being an expert can get in the way of seeing the issues from a student's perspective. The beauty of being a content novice is that you have an outsider's level of excitement and curiosity. Questions that might be demeaning to experts are enticing to content novices, just as they'll be enticing to your students—who will be more interested in learning because you've asked the right questions from the start.

Moreover, one of the reasons we become so exhausted when we teach as content novices is that we don't know what's important to know. Once you've identified the end questions, you'll have a better sense of which concepts you'll need to research more intensively before class, instead of simply doing additional research on every detail in the reading that's new or hard to pronounce.

Talk to supportive colleagues. First find someone knowledgeable about the topic you'll be teaching who can help you determine the important questions to ask. You'll also want to talk to another professor about the fact that you're teaching outside of your expertise, someone who will listen supportively to your concerns. As I discovered in my interviews, most instructors have taught outside of their expertise at least once, and if the person to whom you turn is reflective and insightful about his teaching experience, he might offer some savvy advice.

Read the materials before the course begins. You may be thinking that is obvious. But it's important to keep in mind, as it will improve your teaching and make life more manageable once the course begins. As you read each chapter, consider the following:

- Does the chapter raise any big questions for you?
- Which items in this chapter strike you as the most or least interesting?
- Which theories, findings, events, cases, or equations are most important to the field, to the best of your knowledge? If you can't answer that question because the topic is too far outside of your discipline, which concepts seem to get the most coverage in the chapter?
- Which concepts or examples are the hardest for you to understand? One of the best ways you can use class time is to help students make sense of ideas that are unclear from the text alone.

- What background information will help students understand the chapter? This may be one area where you can draw on your existing expertise.
- Is there any advice you'd like to give students before they read the chapter? Or try completing this sentence for students: "Come to class ready to ..."
- If you, the instructor, could pick only two or three things that you'd like to learn more about before you teach the chapter, what would they be? It's important to introduce big questions early in the course, both in the syllabus and on the first day of class, so that students see your vision and what they should be able to do by the end of the course.

Spend some time early in the course on a topic within your expertise. That can reduce your anxiety levels. You also build credibility with the class if you start from a place of confidence, where you have facts, terms, and examples at your fingertips. In fact, an instructor from the College of William and Mary organized her course so that the entire first half of the semester was comfortably focused on her expertise. The second half ventured into new applications of those concepts, but only after she'd already established a rapport with students.

Build flexibility into the syllabus. A common source of anxiety a few weeks into a new course is the concern that you're falling behind or running ahead of schedule. One way to create flexibility is to list the topics and readings on the calendar by week rather than by individual class sessions. Another strategy is to include a class with a short reading and an ambiguous topic about half-way into the course, simply to build in a catch-up day. You can also indicate in the syllabus that a revised calendar will be issued midway through the course if needed.

Use at least one case study. That way, you won't need to prepare as broadly. Instead of trying to cover all conceivable topics, cafeteria -style, you can focus your background reading on the case. Moreover, students are more intrinsically interested in the topic when they are trying to crack a case-based problem, which means they are less driven by grades and more driven by their curiosity. One reason that cases work so well for teaching unfamiliar topics is that students share the burden of being fact-finders. They are actively working to understand how all the pieces of the case fit together, rather than passively waiting for you to assemble everything in perfect working order.

Through my research, I've also found that people who teach outside their expertise can make common mistakes, including:

Underestimating the preparation time. Even if you're excited about the course and volunteered to teach it, it will zap your time and energy. Lydia McAllister, an associate professor of nursing at Seattle University, summed it up as follows: "You should assume that, midway through the course, you're going to be more tired than usual —and by the end, will need a much better vacation."

Assigning too much work. Part of the problem is related to the first mistake —it's hard to gauge how much work and time the courseclass is going to take. You may be modeling the course after someone who had more content expertise, particularly if you're working from someone else's syllabus.

Some instructors also assign too much because they are tempted to try a variety of assignments. But if you try too many novel ideas, you could find yourself slogging through mounds of unexpected work. The simplest, most concrete step is to reduce the number of graded assignments by one. By removing just one paper or problem set, you've saved yourself a considerable amount of time: the time it takes to create the assignment,; meet with anxious students before it's due,; generate grading criteria,; grade the assignments,; offer feedback,; and wrangle with students about the whole process afterward.

Failing to manage expectations. You don't want to set unrealistic expectations or avoid direct conversations about expectations altogether and then disappoint people. It's particularly important to talk with departmental colleagues who have a commitment from you. You don't have to fully disclose that you're teaching something you don't know —simply tell them that you're doing some new prep and it's a lot of work. If you're collaborating on a research project or writing a paper, discuss what you can and cannot contribute while you're preparing and teaching the course. If you're on a committee, talk with the chair and agree to take on more tasks or responsibilities later in exchange for a work reduction now.

Forgetting what you've learned. Maybe your mantra is, "Never give tests on a Friday" or "Build in time for student meetings at midterm." It's surprisingly easy to forget those strategies when you're dealing with unfamiliar topics. It's fine to begin with someone else's syllabus because that can save you time and anxiety, but before you are lulled into complacency by their course design, step back and take 15 minutes to think about your other teaching experiences. Whatever golden truths you've learned, honor them here, too.

Over-preparing for each day in class. If you prepare too much, you can become exhausted and resent the students. And if you're cramming the night before to research just a few more sources, you won't have time to organize it all. An alternative strategy is to begin by identifying your three or four learning objectives for the day and outlining the class according to those objectives —in other words, use backward design for each individual class day. Ask yourself, on the basis of what you've read about Concept A, what would you reasonably expect students to be able to do? What should students be able to do when they've finished studying Concept B? Although it takes time upfront, you'll be more efficient and strategic in deciding what you do and don't need to do to prepare for class.

Lecturing too much. You may want to resort to lectures when you teach content that's outside your comfort zone, because they are more predictable than discussions and active learning. When you're in lecture mode, students are less likely to ask questions that you can't answer. Moreover, you may think that lecturing will save you preparation time. You're taking notes as you read and learn the material, so the easiest thing to do is to use these newly constructed notes as your lecture notes. You don't have to step back from the material and analyze it for the most thought-provoking discussion questions. You can just staple your notes and go.

But lecturing takes a lot of time to prepare, and, despite all your efforts, your students may not learn as much when you lecture at them. Instead, insert mini-discussions into your lecture. For example, an instructor was leading into a lecture on the properties of microwaves, but he began with a brief discussion on microwaving potatoes to stimulate interest in the topic.

Focusing on lists. When professors teach outside of their expertise, their lectures tend to be heavily peppered with lists, such as the "eight most powerful political parties in India," or the "12 steps to designing an effective wWeb page." In part, faculty members who are new to the material may rely on lists because they provide pre-packaged, well-organized information.

But students can often get that information directly from their textbooks or the Internet. Further, you might be sending the message that you value rote memorization when you really want students to understand those concepts, not just list and recite them.

Try to engage students by examining the relationship among the items on the list. Why are some items on the list and not others? Why is the list organized this way? Construct the list using students' input. Write the title and first item from the list on the board, then invite students to generate the rest.

Teaching outside your expertise can be intimidating, but you don't need to know everything to create an environment in which students learn new things. As Codrina the chemist remarked to me, "Students don't learn more when you're perfect." They learn more when you're human and you make the classroom a place where it's safe to ask questions.

Therese Huston is director of the Center for Excellence in Teaching and Learning at Seattle University. This essay is adapted from *Teaching What You Don't Know*, to be published next month by Harvard University Press. Copyright(c) 2009 by the President and Fellows of Harvard College.