

What I learned from a nanoquiz

Daniel Jackson

July 2014

This past Spring, I was one of the lecturers for 6.813, the user interface design course developed by Rob Miller. It's a wonderful course from which I learned a great deal—and my sense is that the students learned a great deal too. When I teach any subject, I hope to learn not only some more about the subject, but also about teaching.

This course interested me in particular because of its flipped classroom. The students are given comprehensive notes to read in advance; the classroom session begins with a “nanoquiz” consisting of three or four multiple-choice questions about the material presented in the notes, and then proceeds with a mixture of discussion of examples, presentation of new ideas, and in-class activities.

The rationale for the nanoquiz is two-fold: to test the students' understanding (both for their own benefit and for ours), and to encourage class attendance. Grading of the nanoquizzes is rather lenient: a student's lowest 5 nanoquiz grades are dropped; they can write in explanations and thus obtain partial credit for incorrect answers; and the credit for a missed nanoquiz can be partially regained by submitting a nanoquiz question instead. Needless to say, the creation and grading of these nanoquizzes is a considerable amount of work.

I've always been unsure of the value of nanoquizzes. On the one hand, it is a commonplace assumption of education nowadays that short quizzes enhance learning. More importantly, the effect on attendance is dramatic, and I've been told by students repeatedly that without nanoquizzes they would attend less frequently. On the other hand, nanoquizzes are unpopular with students, and they complain about them even while admitting their benefits.

Preparing for my upcoming class this fall, I've been wondering whether to use nanoquizzes. I'm torn. There's a side of me that says: “The students are adults. They're entitled to make their own decisions. If your class isn't valuable enough for them to come of their own accord, it's silly to force them to come by with pedagogically dubious carrots and sticks. And so what if it reduces attendance by half? Let the students who value in-person teaching come to class, and stop worrying about the rest.” It's an appealing argument, both emotionally and pragmatically—and having fewer students in the classroom would make it easier to engage more of them meaningfully.

But I also know that it's wrong. We all make bad decisions, and students are no different. I have heard time and again from students who miss class sessions and come to regret it, and have found that students who miss class do more poorly (and the strongest students are invariably the most eager attendees). In fact, most of the students who've told me in person that they don't like nanoquizzes grudgingly admit that their forcing effect on attendance makes them, on balance, worth keeping. Moreover, while it would make life easier to focus on the students who are already the most enthusiastic and engaged, that would seem to defeat the very purpose of education, which is surely to work to inspire every student in the class.

So when the course evaluation results became available, I was curious to see if there were comments

about the nanoquizzes. And boy, were there comments! In the “what’s not cool?” category, nanoquizzes were mentioned more than 20 times, in more than half of the comments. And there was one particularly painful contribution that singled me out personally:

Student 28015 - Daniel Jackson laughing at people missing ridiculous rote-memorized detail questions on his nanoquizzes.

Now this particular student, I believe, was complaining about a moment I remember well. I had given a nanoquiz late in the term on the topic of typography, that actually covered not only the reading but also a class I had taught. When I was going over the answers, there was a collective groan from a good number of students. I was frankly taken aback. I was of course not pleased to discover that apparently many students had not only been unable to answer my questions correctly, but also thought they were unfair. Embarrassed and trying to lighten up a tense situation, I made a lame joke about the need to know about typography so that you can hold your own at cocktail parties with graphic designers and other cool people. I certainly had not meant to belittle the students.

Several students accuse us of intentionally trying to mislead them:

Student 14158 - nanoquizzes aimed at tripping up students

Student 15281 - nanoquizzes are designed to be tricky and there are times when most of the students would get caught by a seemingly unimportant word/phrase in the question.

I’ve reflected on this incident and what went wrong, and reached some tentative conclusions. First, I failed to do the most obvious thing that the situation called for: to respond directly to the students’ frustration. I should have asked some students to explain why they were groaning, and then, assuming they had expressed the point of view given in the class evaluation, I should have explained what motivated the questions and why I thought they would be useful.

Here’s what I might have said. There were three questions in this nanoquiz. Each was designed to test understanding of a particular concept. The first asked about letter spacing, and expected them to know what letter spacing is, how it differs from kerning, and that it’s usually best not to tamper with the default. The second asked about x-height, and attempted to elicit the idea that x-height is a key metric of readability. The third asked some questions about fonts that many software engineers would not be able to answer correctly, but which directly corresponded to major sections of my class on typography: that italic fonts are not generally produced by algorithmic transformations of roman fonts; and that although fonts are scalable, professionals use special faces for very large and small type (since geometric scaling damages the perceived stroke width).

These were not small, nitpicky points. They were the very essence of what I was trying to convey in the earlier class. It is true that there were two options in the questions that were more frivolous. One asked them whether Goudy had compared letter spacing lower case to stealing sheep (perhaps the most famous quote in typographic history). I had mentioned this in class (and even showed a picture of a book I recommended called “Stop Stealing Sheep”), and thought it reasonable to give a tiny reward to the students who remembered it. The other required distinguishing geometric from humanistic san serifs,

perhaps expecting too much, even though I had shown a slide of samples of humanistic sans serifs and talked about them.

My hypothesis is that many of the students who complained bitterly in the evaluations expected the notes and the material presented in class to be superficial and assimilable without much effort (and in fact the common view of the course amongst students is that it's an easy course with easy material). I wonder if they don't expect to have to read deeply, or to try and sort out for themselves what the key ideas are. I worry that deep reading and analytical thinking are not skills that we encourage in our students, with all the emphasis that we place on problem solving. From this perspective, the nanoquiz incident reflects a more pervasive failure: to get the students to engage with the material at a deeper level.

Perhaps more troubling than any of this, however, is what I believe underlies the students' anxiety. Their biggest worry is nothing to do with the pedagogical soundness of the quiz. It's simply that their aim is to score points and get a good grade, and they feel betrayed when the strategy they have developed to do that proves to be imperfect. Our students want to do big things and change the world, but somehow, when they walk into our classrooms, their focus narrows. Understanding deeply goes out the window in favor of getting the assignment done. I don't blame them alone for this; I believe it's an attitude that has been inculcated over the years by their experiences. And we collude, in how we grade, by punishing non-conformity and by not adequately rewarding insights and creativity.

It's appalling that some students actually believe that we, the teaching staff, are out to get them—that we have so little pride in our pedagogy that we would actually prefer to test for rote knowledge, or worse to trick students intentionally, rather than to devise questions that capture the essence of what we're trying to convey. This, for me, is the larger lesson of the nanoquiz. Whether intentionally or not, it creates an adversarial relationship between teacher and student (and its somewhat disingenuous use as an incentive to attend class makes things worse).

The class evaluation process exacerbates the problem. It suppresses dialog about real issues by hiding all comments from readers; all comments are hidden in the version that students and other faculty see. And just as bad grading schemes push teachers to measuring trite aspects of learning, so an evaluation whose only public form is a collection of numbers pushes faculty to avoid any risk of upsetting students. Consider the outsized effect of a handful of angry students who reflexively give the lowest rating in answer to every question. In this class, there were three such students (out of a class of 237), but they reduced my own overall rating by a full quarter of a rating increment.

I'm not sure how to solve this problem, although I am convinced that it will never be solved satisfactorily in the confines of a single course. If we want to create a different, more trusting relationship with our students, and to inculcate different values, we will need to change our culture from the very start—or at least from the first departmental courses in the sophomore year.

I don't want to overexaggerate this problem. Our students are extraordinary, and achieve great things. We invest huge effort in our teaching, and students appreciate it. This particular class received high numeric ratings in its evaluation, and many positive comments. But as we embark on experiments that may reduce even further our personal interaction with students, it will become yet more critical to find ways to

strengthen our mutual relationship and set ourselves on a shared path to deeper understanding.