"Doubling student engagement"

Piazza helped a professor double the engagement - and publications - in his PhD level software engineering class.

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Q: *So we're talking to professors about how they use technology in their classrooms in 2015, and I understand you teach one class almost completely online. Tell me about that.*

A: "Well, it's a PhD-level seminar called Software Engineering Experimentation—I've been teaching it since the early nineties. We study how software engineers design and carry out experiments to validate their research. I assign a lot of experimental papers to read and then students carry out small-scale experiments of their own and write up the results. I run it almost like a conference. It's been very successful in that a lot of students have been able to take their work and eventually publish it, or start projects that led to PhDs."

Q: *What prompted you to take it online?*

A: "A couple years ago I was asked to teach the class at a university in Sweden. My response was, I can't go to Sweden for a semester! That's just too much. But I kept thinking about it and eventually it occurred to me, What if I tried to do it online? I had this idea that instead of coming to class once a week for two and a half hours, we could just talk on a discussion board. At the time, I'd been trying to figure out how to use discussion boards more, but the problem with George Mason's is that it's available only to enrolled students. Then I happened to get an email from my department chair with some information about Piazza. He said, "Here's some spam, in case anybody's interested." I thought, This may be useful spam for once! Of course I figured Piazza wouldn't be any good, but since I was looking for a discussion board I tried it. And the first thing I noticed was just now usable it is. One of the topics I teach is usability, and my first reaction was, Wow, this is so much more usable than any other discussion board I've seen. The overall feeling of it was, rather than bringing students to my house for a party—which is always a little awkward—that they were hosting a party, and I could drop in occasionally. That was magic."

Q: *Did you test it out in another class before using it in your PhD seminar?*

A: "Yes, and I was just amazed at how much richer the discussion was. The following spring—this was 2012—I put my PhD seminar almost entirely online, with nine or ten students in Sweden and twelve or thirteen at George Mason. Each week I'd assign two or three papers and appoint a couple of people to summarize and critique them. They'd have to post their critiques to Piazza by Monday. I also assigned a "dissenter" for each paper, or someone who had to disagree with it, and find all the flaws. That's a Swedish idea—they use it in their PhD defenses. For me it was just a little game to increase the amount of discussion."

Q: *So did you still meet in person, or did the whole class consist of online discussion?*

A: "The first week, I met students in the classroom and said, "We won't be here again." The only exception was the last two meetings, when they presented their papers live. We broadcast that to Sweden. But afterwards, one of my students said, "You know, that was the most boring part of the whole class, because I had to sit here and listen. I couldn't use my computer." "

Q: *So you didn't lecture at all? Did you post video lectures?*

A: "I had three or four recorded lectures about some of the general issues we were covering, and I did post those on Piazza. But they accounted for only three weeks' worth of the class. Other than that, it was just discussion of the papers I assigned them to read, with Piazza as the discussion board."

Q: *How did you notice the class change?*

A: "At a certain point in the semester I started to feel like there was more discussion than we'd had in the past. So I went online and found a couple of formulas for equating word counts to verbal discussions. I concluded that every paper had three to four times more discussion than in past seminars. The other thing that was measurable was that in previous years, about one quarter of the students turned their projects into publishable papers. This time, it was more than half. Of course there are a lot of things that could affect that, but I'm convinced it's because we had deeper discussions. I also asked students to post drafts of their papers on the discussion board, and their peers gave really good feedback that dramatically improved their work. So I'm very confident that students learned more. More of them had publishable research—I mean, it doubled."

Q: *Why do you think the discussions were so much better on Piazza than they had been in person?*

A: “Well, they weren’t locked into two hours on a Monday afternoon—they went on for a full week! Another thing is that students no longer had to come in at the end of a workday, when they were tired. We have a lot of part-time students. With the new format, they could comment when they were fresh. If you got in your car and suddenly thought, Oh, I should’ve commented on this, well, you could go home and do it. They had time to think about their contributions and even revise and edit them. So the discussions were longer, deeper, and more nuanced. I had hoped to use Piazza to make the class almost as good as it had been previously. What I found was that it made it much better.”

Q: *What did the students think of it?*

A: “In general, the online format helps people who are less verbal and more written learners, and that actually describes a whole lot of people in computing fields, and a lot of engineers. I had one PhD student who never said a word in previous classes. And I was a little worried, because I thought, as a PhD student, that she should be more expressive. But on Piazza she wrote as much if not more than anybody, and was very articulate and thorough in her analysis. She became a leader in the class, and that never would’ve happened in person. I should add that this format also helps people who are in a bit of a minority in the classroom. In engineering classes, that includes women. They know they stick out in the classroom, so the online format is a bit more freeing for them. On Piazza, they can show that “Yes, it’s not that I don’t talk because I’m dumb, but because all these boys look at me and stop thinking about engineering and start thinking about girls.” One of my students actually said that to me directly.”

Q: *Are there any other tools you’ve tried in your classes?*

A: “Well, I’ve tried Blackboard, because my university uses it. But it is—especially for software engineers—just so embarrassing. Even if I could get students from Sweden on it, which I can’t, it’s so difficult to organize a discussion, and the navigation is just painful. The way that Piazza sets up the folders is much more convenient. Not to mention the editing and formatting facilities, with HTML and LaTex in particular, and the ability to go back and modify postings. Students can even work together to modify the same posting, which is just a terrific idea that helps discussion come alive.”

Q: *So are you planning to teach the class mostly online with Piazza again this spring?*

A: “Yes, I’m teaching it with the same university in Sweden, though I’m actually looking for a few other partners, too. I want to expand this model. I could never imagine teaching this class in a classroom again. It would just be too boring.”