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How Peer Instruction and Polling Have Changed My Teaching

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In 24 years of teaching, I've worked with a lot of experts in instructional technology, and without exception, they all preach the same mantra: Pedagogy first, technology second. Design your learning goals, they all say, and then we can help you determine which technologies might help you meet those goals.

I'm grateful for that reasoned, cautious approach. The last thing I want in my classroom is some new gizmo that has been pushed on me by an IT staffer, that I have to fumble with in front of a group of bored students, and that will expire in a shower of sparks just when I need it most. Over the course of my career I've spent many hours staring in bewilderment at a variety of classroom technologies — from overheard projectors and DVD players to VGA cords and display control panels.

Yet despite my admiration for a measured approach, my own recent experiences have persuaded me to adopt a more playful, exploratory attitude on this front. Rather than seeing ed tech as a simple servant to my pre-existing classroom goals and practices, I have come to recognize how it can help shape the goals I might set for my students and the practices I might adopt to improve their learning.

That lesson unfolded for me over the past year, as I have been incorporating peer instruction and electronic polling into my courses. The form of peer instruction that I use derives from the work of Eric Mazur, who began posing questions on course concepts to his physics students at Harvard University in the 1990s. First, he asked them to respond on their own, and then to explain or justify their answers in quick discussions with their peers. Afterward, if they'd changed their minds, they could resubmit an answer.

Mazur used their responses to pace his instruction: If most of the class answered correctly, he could move on to new topics; if not, he knew that he had to spend additional class time on the concept. To get a quick overview of students' responses, Mazur gave them handheld clickers, with the results visible to him on a computer screen. Nowadays, in most college classrooms, clickers have mostly been replaced by online polling technologies that enable students to use their own phones or laptops.

When I first read about peer instruction, it struck me as a terrific teaching strategy, but one I didn't immediately adopt. That may have been because I was intimidated by the prospect of using handheld clickers — although you can just as easily do peer instruction without the technology, with the help of colored index cards. Still, for whatever reason, I recognized it as a great idea but didn't use it.

The book that persuaded me to give peer instruction a try — and that helped me feel comfortable with electronic polling — was Derek Bruff's *Teaching With Classroom Response Systems.* It provides a rich array of methods for using polling technologies (or personal-response systems) to promote better classroom experiences. Although it was originally published in 2009, Bruff's book remains for me an essential read on understanding how technology can foster better learning.

Drawing primarily on Bruff's work, I began experimenting with polling a couple of years ago when I gave keynote lectures and led faculty workshops. I was astonished at how effective it proved in enlivening a lecture or gathering quick and useful feedback from the audience. I used Poll Everywhere, a free service (with paid upgrades for those who wish to use them) that I found easy to understand and manage.

When I finally started using Poll Everywhere in my actual courses, I did so — as any good instructional technologist would recommend — cautiously and in service of my existing teaching practices and course objectives. An essential goal for me in every course has always been to make students feel comfortable participating in class, and to encourage as many of them as possible to speak up. Peer instruction, aided by electronic polling, gave me an opportunity to invite quiet students to engage more actively in class, both through the polls and through the subsequent discussions.

My initial poll questions invited students to voice their opinions about works we had read, or offer interpretation of specific passages. For example:

- As an easy starter question for students who were reading Zadie Smith's complex novel *White Teeth,* I asked: Which character did you find most compelling?
- In a literature-survey course, after students read Christina Rossetti's poem "Goblin Market," I asked: Give a one-word interpretation of the meaning of the goblin fruit in the poem.

Early on in my peer-instruction forays, I usually followed Mazur's model: I would pose a question, ask students to reply via their phones or laptops, and then invite them to turn to a neighbor (or two) and explain or justify their answers. Polling absolutely increased student engagement, both during those peer conversations and in the larger class discussion afterward.

This past semester, I decided to try peer instruction in my first-year composition course. I was seeking a new way to teach an old chestnut: how to avoid writing comma splices. That grammatical error dwarfs all others in my students' papers, but is not an easy one to fix.

Enter peer instruction: I wrote five sentences — some of which had comma splices and some of which did not — and put them up as poll questions. Students could simply indicate "correct" or "incorrect" for each one. After casting their vote on each, students had to turn to their neighbor and explain their responses.

As I eavesdropped, and later as we discussed each sentence as a group, I discovered something that had never occurred to me before: Even students who answered correctly could not articulate the relevant grammatical rule.

As they worked through each sentence with one another, though, I saw light bulbs beginning to illuminate in their minds — something that I'm quite sure has never happened before while I was teaching a grammatical rule. Even in their exploratory, fumbling conversations, students were figuring out how to explain the concepts of dependent and independent clauses to one another — and in so doing, were learning it for themselves.

After class, a student whose first paper had been littered with comma splices told me that it was the first time he really understood the problem, even though he had been taught it many times before. I have seen a significant difference in the papers that followed throughout the semester, with substantially fewer comma splices.

I saw enough positive effects from my classroom experiments that I could easily have stopped there. But once I became comfortable with electronic polling, I began to envision other ways I could put it to good use. I've been convinced in recent years of the power of offering students more autonomy in class, and letting them help make decisions about the direction of the course or the nature of assessments. Polling opened up a new way for me to collect their suggestions on the course.

I realized that I could pose questions about recent or forthcoming content, gauge their interest or assess their comfort level with a topic, and adjust accordingly (on the value of such adjustments, see David Gooblar's excellent essay). For example:

- In a literary-theory class, I asked students a poll question about the theories that they found most — and least — difficult to understand. The results were the opposite of what I would have predicted: They all felt comfortable with feminist theory and baffled by postcolonial theory.
- In a literature-survey class, students responded to a question about which of the Romantic poets we had read seemed most — and least — relevant for us today. Congratulations to Robert Burns, and condolences to William Wordsworth.

In both classes I've made adjustments to my course plans based on their responses. I have asked students these kinds of questions in the past, but doing so in an open discussion usually leads to a few dominant voices expressing their singular views. Done as a poll, all of the students got to express their opinions, and could quickly see how their peers felt — something I know they found illuminating as well.

Electronic polling snuck into my class through peer instruction, but once it had arrived, it opened my eyes to other pedagogical goals and practices. This semester I am teaching in a classroom outfitted with some high-tech collaborative-learning machinery, and although I have not yet mastered its intricacies, I'm much more open and curious about it than I would have been even a year ago. I've invited my students to explore it with me, and we have been engaging in a little bit of technological play.

I don't advocate here for incorporating technology in the classroom if you're uncomfortable with it, or if continually experimenting with ed tech threatens to disrupt the flow of your courses. But I have come to recognize how the road between technology and learning can be a two-way street. Sometimes technology can help us achieve the learning goals we have already set for our students — and sometimes, if we remain open to new possibilities, it can spur us to think anew about our own teaching goals and practices.

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