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ELEMENTS

THE CASE FOR BANNING LAPTOPS IN THE CLASSROOM
BY DAN ROCKMORE

A colleague of mine in the department of computer science at Dartmouth recently sent an e-mail to all of us on the faculty. The subject line read: "Ban computers in the classroom?" The note that followed was one sentence long: "I finally saw the light today and propose we ban the use of laptops in class."

While the sentiment in my colleague's e-mail was familiar, the source was surprising: it came from someone teaching a programming class, where computers are absolutely integral to learning and teaching. Surprise turned to something approaching shock when, in successive e-mails, I saw that his opinion was shared by many others in the department.

My friend's epiphany came after he looked up from his lectern and saw, yet again, an audience of laptop covers, the flip sides of which were engaged in online shopping or social-media obligations rather

than in the working out of programming examples. In a "Network"-inspired Peter Finch moment, he quickly changed the screen of his lecture presentation to a Reddit feed and watched some soccer highlights. That got everyone's attention.

I banned laptops in the classroom after it became common practice to carry them to school. When I created my "electronic etiquette policy" (as I call it in my syllabus), I was acting on a gut feeling based on personal experience. I'd always figured that, for the kinds of computer-science and math classes that I generally teach, which can have a significant theoretical component, any advantage that might be gained by having a machine at the ready, or available for the primary goal of taking notes, was negligible at best. We still haven't made it easy to type notation-laden sentences, so the potential benefits were low. Meanwhile, the temptation for distraction was high. I know that I have a hard time staying on task when the option to check out at any momentary lull is available; I assumed that this must be true for my students, as well.

Over time, a wealth of studies on students' use of computers in the classroom has accumulated to support this intuition. Among the most famous is a landmark Cornell University study from 2003 called "The Laptop and the Lecture," wherein half of a class was allowed unfettered access to their computers during a lecture while the other half was asked to keep their laptops closed.

The experiment showed that, regardless of the kind or duration of the computer use, the disconnected students performed better on a post-lecture quiz. The message of the study aligns pretty well with the evidence that multitasking degrades task performance across the board.

Pop quizzes, of course, are not the best measure of learning, which is an iterative and reflective process. Recent Princeton University and University of California studies

(http://pss.sagepub.com/content/early/2014/04/22/095679761452458 took this into account while investigating the differences between note-taking on a laptop and note-taking by hand. While more words were recorded, with more precision, by laptop typists, more ended up being less: regardless of whether a quiz on the material immediately followed the lecture or took place after a week, the pen-and-paper students performed better. The act of typing effectively turns the note-taker into a transcription zombie, while the imperfect recordings of the pencil-pusher reflect and excite a process of integration, creating more textured and effective modes of recall.

These examples can be seen as the progeny of an ill-conceived union of twenty-first-century tools (computers, tablets, smartphones) with nineteenth-century modalities (lectures). I'm not discussing the "flipped classroom," wherein lectures are accessed outside of class on digital devices and the classroom is used as a discussion and problem-solving forum. Massive Open Online Courses (MOOCs) and other forms of online learning can release learning from the restrictions of time, space, and, to some degree, money. Nor am I surveying the wide range of software and apps that are available, many of which have ably engaged new learners and engendered new and creative habits of mind.

Common to all of these contexts is the human-machine interaction. Our "digital assistants" are platforms for play and socializing; it makes sense, then, that we would approach those devices as game and chat machines, rather than as learning portals. The specific form of attention that we bring to this environment may certainly constrain the way in which the information is presented. Design matters and is contingent and dependent on the medium of choice. The blurring of play and pedagogy, for example, is rife in the lower grades. There is no denying that the infusion of a sense of play into the learning process is valuable, but some of the intersections of this philosophy with the actual mechanics of computer-game design give pause. My children

play math games that combine the speed of an active video game with the materials of basic arithmetic—rewarding fast play and correctness—but why is it so important that they solve math problems as if they were driving a digital sports car at high speed? What about the integration of digital reward systems, so prevalent in and important to the business models of online gaming, into learning? These games prime and then exploit the user's "compulsion loop," an acknowledged behavioral modality linked to addictive behavior.

While the departmental e-mail conversation that followed the cry of "Ban the laptops!" was largely one of agreement, there were a few voices suggesting some kind of mediated approach. One colleague is considering dividing the lecture hall into two groups—one of laptop users and the other of pencil or pen-and-paper-pushers, thereby at least keeping the acknowledged distraction of a nearby open laptop away from those who chose the old-school method. Other colleagues have wished for a "kill switch" that would allow an instructor to disable the local wi-fi connection. This technology does, in fact, exist—just not here, not yet. There was also a voice pointing out that, for some kinds of classes, it's just not feasible within the class design and pedagogical goals, although this might also be more about the on-off kind of access we have to the Internet.

I had one small suggestion, which I will implement the next time I teach (and for that class, I will generally continue to have the laptops closed): I will require my students to read some of the studies I've alluded to in this post, to help them understand why I'm doing what I'm doing and to get them to think critically about the use of technology in their lives and their education.

We're not all that far along in understanding how learning, teaching, and technology interact in the classroom. Institutions should certainly enable faculty to experiment with new technology, but should also

approach all potential classroom intruders with a healthy dose of skepticism, and resist the impulse to always implement the new, trendy thing out of our fear of being left behind.

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