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Electronic education

Flipping the classroom

Hopes that the internet can improve teaching may at last be bearing fruit

Sep 17th 2011 | LOS ALTOS | from the print edition

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THE 12-year-olds filing into Courtney Cadwell's classroom at Egan Junior High in Los Altos, a leafy suburb of Silicon Valley, each take a white MacBook from a trolley, log on to a website called KhanAcademy.org and begin doing maths exercises. They will not get a lecture from Ms Cadwell, because they have already viewed, at home, various lectures as video clips on KhanAcademy (given by Salman Khan, its founder). And Ms Cadwell, logged in as a "coach", can see exactly who has watched which. This means that class time is now free for something else: one-on-one instruction by Ms Cadwell, or what used to be known as tutoring.



MacSchool

So Ms Cadwell, in her own web browser, pulls up a dashboard where KhanAcademy's software presents, through the internet, the data the children are producing at that instant. She can view information for the entire class or any individual pupil. Just then she sees two fields, representing modules, turning from green to red, one for Andrea, the other for Asia. Ms Cadwell sees that Andrea is struggling with exponents, Asia with fractions. "Instead of having to guess where my students have gaps, I can see it, at that moment, and I walk over to that one student," says Ms Cadwell, as she arrives at Asia's chair.

While the other pupils continue to work at their own pace and at different problems, Ms Cadwell now spends a few minutes just with Andrea and Asia. Soon Andrea has an epiphany and starts firing correct answers, getting, in KhanAcademy's jargon, a "badge", then going "transonic". A few minutes later, Asia also gets a "streak". She lets out a shriek. Ms Cadwell, with a big smile, is off to another pupil. "The growth in these kids is just staggering," she says. "This is the future. I don't see how it couldn't be."

This reversal of the traditional teaching methods—with lecturing done outside class time and tutoring (or "homework") during it—is what Mr Khan calls "the flip". A synonym for flip, of course, is revolution, and this experiment in Los Altos just might lead to one. For although only a handful of classes in this public-school district tried the method in the last school year, many other schools, private and public, are now expressing interest, and the methodology is spreading.

Indeed, philanthropists such as Bill Gates have such high hopes for the new method that they

have given money to KhanAcademy, a tiny non-profit organisation based in Mountain View, next to Los Altos. This means that the more than 2,400 video lectures, on anything from arithmetic and finance to chemistry and history, will remain free for anybody.

If KhanAcademy were merely about those online lectures, of course, it would be in good but large company. Increasingly, teachers, professors and other experts make their talks available online: on iTunes, YouTube or university websites. Some, such as Michael Sandel at Harvard with his philosophy lectures, have become minor celebrities. More and more sites exist purely to spread learning—some free, such as AcademicEarth.org; others not, such as TheGreatCourses.com.

Watching lectures online, or on a smartphone or iPad on the go, has advantages, as Mr Khan has discovered from the huge number of comments he gets on his site. Children (or adults, for that matter) need no longer feel ashamed when they have to review part or all of a lecture several times. So they can advance at their own pace.

But lectures, whether online or in the flesh, play only a limited role in education. Research shows that the human brain accepts new concepts largely through constant recall while interacting socially. This suggests that good teaching must “de-emphasise lecture and emphasise active problem-solving,” says Carl Wieman, a winner of the Nobel prize in physics and an adviser to Barack Obama.

To KhanAcademy’s fans, the flip that Mr Khan advocates helps to do just that. As a tool, KhanAcademy individualises teaching and makes it interactive and fun. Maths “is social now,” says Kami Thordarson, as the 10-year-olds in the 5th-grade class she teaches at Santa Rita Elementary School huddle round their laptops to solve arithmetic problems as though they were trading baseball cards or marbles.

The system has its detractors. First, it may not be much use beyond “numerate” subjects such as maths and the sciences; KhanAcademy does have a few history offerings, but they are less convincing than the huge number of maths and science ones. Second, even in these subjects KhanAcademy implicitly reinforces the “sit-and-get” philosophy of teaching, thinks Frank Noschese, a high-school physics teacher in New York. That is, it still “teaches to the test”, without necessarily engaging pupils more deeply. Worse, says Mr Noschese, KhanAcademy’s deliberate “gamification” of learning—all those cute and addictive “meteorite badges”—may have the “disastrous consequence” of making pupils mechanically repeat lower-level exercises to win awards, rather than formulating questions and applying concepts.

The teachers now using KhanAcademy counter that it is meant to be merely one, not the only, teaching tool, and that by freeing up class time it also makes possible other projects that do exactly what Mr Noschese promotes. In the fifth-grade class at Santa Rita, the children have made a tile floor (requiring fancy maths to estimate sizes, shapes and numbers). When this correspondent visited, they practised on KhanAcademy but then played SKUNK, a game involving probability.

America’s standardised tests are now “easy, a floor, not of interest”, says Ms Thordarson. She feels that the tool thus allows her to teach better and go deeper. But “You have to be more creative and more flexible, which is challenging,” she says. It’s not for teachers who “want to turn a page in a book”, adds Kelly Rafferty, the co-teacher. They thereby answer one common misconception about KhanAcademy: that it makes live teachers less relevant. Mr Khan, the teachers and Mr Gates all insist that the opposite is the case. It can liberate a good teacher to become even better. Of course, it can also make it easy for a bad teacher to cop out.

The value of teachers

The arrival of a powerful new tool thus does not replace the other necessary element in education reform, the raising of teacher quality. Good teaching is the single biggest variable in educating pupils, bigger than class size, family background or school funding, says Eric Hanushek, an education expert at Stanford University’s Hoover Institution. And crucial to

having better teachers is evaluating them properly, hiring, firing and promoting on merit.

The teachers' unions, however, are fighting all attempts to move away from systems in which pay and tenure are linked only to seniority and credentials. In some places, such as Washington, DC, the reformers have won a few skirmishes; in others, such as Los Angeles, the unions are digging in for a long war. The core question is how, even whether, teachers can be evaluated fairly on the basis of exam results or classroom observation (given that some pupils are from educated families, others from poor areas, and so on). The unions are doing their best to ensure that evaluations have no consequences in staffing.

Technology can play a part here, because, in essence, evaluation is an information problem. Today's standardised tests are deservedly unpopular with teachers and parents because, first, the "standards" tend to be low (and easily lowered further); second, teaching to the test is a form of dumbing down; and third, the tests take place only once or twice a year.

By contrast, spend a few minutes playing with the KhanAcademy dashboard of a class in Los Altos, and you see a vision of the future. You can follow the progress of each child—where she started, how she progressed, where she got stuck and "unstuck" (as Ms Thordarson likes to put it). You can also view the progress of the entire class. And you could aggregate the information of all the classes taught by one teacher, of an entire school or even district, with data covering a whole year.

Dennis van Roekel, the president of the National Education Association (NEA), the largest labour union in America with 3.2m members, goes ballistic at this suggestion. "Don't demean the profession" by implying that you can rate teachers with numbers, he says. Besides, this sort of thing would introduce destructive competition into a culture that should be collaborative, he adds (without explaining why data-driven evaluations have not destroyed collaboration in other industries).

The NEA and its supporters will eventually lose this fight, says Kate Walsh, the president of the National Council on Teacher Quality, a think-tank that unions love to hate. "It will be considered fair game to collect the data" and to use them to get better teachers in America's classrooms, she says. It may or may not be KhanAcademy's software that produces this information. Nonetheless, the academy, "by offering a different model, is forcing the issue that people have speculated about", says Mr Hanushek at Stanford. "These technological ideas offer the possibility of breaking a logjam."

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