

THE WALL STREET JOURNAL.

How Humans Can Win the Race Against the Machines

American education is ripe for a technology revolution to prepare students for the 21st century

By [Christopher Mims](#)

Sept. 27, 2015



Schools across the U.S. have adopted 'blended learning,' in which traditional instruction is mixed with lessons delivered on tablets.
PHOTO: ANDREW SPEAR FOR THE WALL STREET JOURNAL

Whatever your measure—the reading and math proficiency of [high-school graduates](#), [the skills gap](#) in the nation's labor market, or the [real value of college](#)—there can be little argument that America's schools, as a whole, are failing to prepare students for the 21st century.

There are countless explanations why, but here's a significant contributing factor: Until recently, we simply didn't know [how to use technology](#) to make teachers and students happier, better engaged and more successful.

Think about it: In every field of human endeavor, from manufacturing to knowledge work, we're figuring out how to use technology to make humans more successful—to raise the quality of their work, if not their measured productivity.

But the same can hardly be said of teaching. In education, the overwhelming majority of students are still learning as they always have, in classrooms dominated by a one-to-many lecturing model in which teachers inevitably leave some students behind while boring others. That model has barely changed in a century.

We've spent billions building "learning algorithms" that allow machines to emulate an ever expanding array of human skills, but only a fraction of that on helping humans outlearn the automation supplanting us in the workplace. What we need is a revolution in educational technology, one designed to leverage machines not merely to replace humans, but to enhance us.



ILLUSTRATION: CARL WIENS

We need to invest just as much money and engineering hours in human intelligence as we have in artificial intelligence.

Fortunately, as the geeks who built some of the world's most powerful information technology are having children of their own, they are waking up to the possibility that their offspring are just as vulnerable to disruption as the rest of us.

“What we have is a huge opportunity to impact the lives of a lot of people in a meaningful way, and it’s also personally relevant to us,” says Max Ventilla, former Google engineer, father and founder of AltSchool, a chain of private schools designed to completely redefine what K-12 education means in an era of big data, ubiquitous devices and cloud-based software.

At the core of the coming revolution in how schools should function and what classrooms should look like is this simple observation: It is a waste of time to ask teachers to deliver information and test students on it when that task can be reassigned, at least in part, to software.

Countless startups are working on this problem, among them Testive, which produces a cloud-based service to help students prepare for college entrance exams.

“We need to just unburden the teacher from having to disseminate content,” says Testive Chief Executive Tom Rose. “It’s such a reductive way to use a person.”

That machines can be better tutors than humans, in certain circumstances, is a hypothesis with a great deal of intuitive appeal, though data to prove it remain largely anecdotal. That hasn’t stopped schools all across America from adopting “blended learning,” in which traditional instruction is mixed with lessons delivered on PCs and tablets.

But the vision of many entrepreneurs in educational technology is to take those systems to a whole new level.

“The idea that everyone gets the same textbook is a ludicrously archaic idea,” says Jose Ferreira, chief executive of Knewton, a software company that uses adaptive learning to decide exactly which lessons and problems to deliver to students. “In the future, everybody is going to have materials—textbooks, games, whatever—in a materials portfolio that updates in real time, that generates in real time, based on what you know and how you learn best.”

To see how this might play out, you have only to look at the K-12 Summit Public Schools, 11 of which are scattered across Silicon Valley and Washington state. Those schools break students’ days into a self-directed series of activities, including private time to work through a personalized “playlist” of instructional tasks on a computer. Summit’s Web-based “personalized learning” system was recently rebuilt by a staff of eight Facebook engineers who came to the schools when Facebook chief [Mark Zuckerberg](#) asked how he could best help Summit create a system that could be offered to public schools everywhere.

The idea isn’t that all education will be replaced by “robot tutors.” Rather, the idea is that the basics can be handled by software, freeing students and teachers to spend the rest of the school day working on group projects, peer instruction and individual mentoring.

“The challenge is not to resort to on-screen learning for everything,” says Mr. Ventilla. “If kids are in front of a tablet all day, it’s not really going to prepare them for the most important parts of their education, which are character skills, social and emotional

learning and the ability to apply what they're learning in the real world, in a decontextualized way.”

It may sound paradoxical to use high tech to make modern schools resemble those of bygone eras. (Picture Socratic dialogues mixed with challenging, rather than rote, vocational training.)

But consider the alternative, which is what many public schools have drifted into: Curricula in which students are overwhelmed with homework and tests, as physical activity and extracurricular pursuits dwindle.

The question isn't whether our schools will leverage the very same technologies that are replacing humans, but whether we can afford for them not to.