How 'Disruptive Innovation' Will Change The Way We Learn

By **Clayton M. Christensen, Michael B. Horn, & Curtis W. Johnson**

All students learn differently. Most of us know this intuitively. We learn best through different methods, with different styles, and at different paces. We remember being in school and struggling to master a concept while a friend of ours grasped it immediately. When a parent or a teacher would explain the same concept in a different way, however, we understood. We had friends who excelled in certain classes, but struggled in others.

Academic research increasingly supports this notion. But although there is considerable certainty that people learn differently, considerable uncertainty persists about what those differences are. Some research suggests that people have multiple intelligences, whereas other research talks about people having different aptitudes.

In addition, within each type of intelligence or aptitude, people have different learning styles. Some learn better through visual means; others need to talk it through, write it down, play it out, and so on. Finally, people also learn at different paces—fast, medium, slow, and everything in between.

Just as it is intuitive to us that we learn differently from one another, it is also intuitive that because of this, each of us needs a different, customized learning approach to maximize his or her potential. When an educational approach is well aligned with one's intelligence or aptitude strengths, understanding can come more easily and with greater enthusiasm.

Yet, there is far more standardization than customization in schools. Schools teach using a monolithic batch system. When a class is ready to move on to a new concept, all students move on, regardless of how many have mastered the previous concept (even if it is a prerequisite for learn-

ing what is next). On the other hand, if some students are able to master a course in just a few weeks, they remain in the class for the whole semester. And when a teacher teaches long division in the manner that corresponds to how she best learned and understood it, it does not matter whether a student grasps the idea and grows bored with the repeated explanations, or sinks deeper into bewilderment, unable to grasp the logic; the student sits in the class for the duration. Both the bored and the bewildered see their motivation for achievement shredded by the system.

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Why is this? It's not that teachers, administrators, and other actors in the school system don't appreciate the need for customization. They do. The system in which they work, however, constrains their ability to customize.

To see why, picture Microsoft Windows. It, like schools, is highly interdependent—you can't build or change one component unless you build or change the others, because each component affects the way the others function. Changing just a few lines of Microsoft Windows' code would necessitate rewriting thousands of other lines. It would therefore cost millions of dollars to custom-configure Windows to meet your needs. The economics of interdependence mandate standardization.

Contrast this with a modular product or service architecture. Here people can change one piece with-out redesigning the other ones. This allows for affordable customization. Linux is a great illustration of this. Once Unix technology had matured sufficiently, an open-source operating system such as Linux became feasible. Linux's architecture is modular and therefore can be customized—witness how the open-source-programming community continually updates and enhances it, kernel by kernel.

Schools are laced with interdependencies—from the fact that a student can't study one concept in 9th grade unless he or she has covered another in 7th grade, to decisions at the state level, such as those regarding curricula and textbooks, that circumscribe the ability of teachers to innovate. This prevents simple, affordable customization. Instead, the economics compel standardization in the way schools teach and test. For evidence, look at how much it costs to tailor an education for students with special needs.

If the goal is to educate every student to the highest potential, schools need to move away from this monolithic classroom model and toward a student-centric model with a modular design that enables mass customization.

Computer-based learning is emerging as a disruptive force and a promising opportunity to make this shift. The proper use of technology as a platform for learning offers a chance to modularize the system and thereby customize learning.

But if this is the case, how does one explain the minimal impact computers have had in the classroom? The United States has spent more than $60 billion equipping schools with computers over the last two decades, but as countless studies and any routine observation reveal, they

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have not transformed the classroom, nor has their use boosted learning as measured by test scores.

That schools have gotten so little back from their investment comes as no surprise. Schools have done what virtually every organization does when implementing an innovation: Its natural instinct is to cram the innovation into its existing operating model to sustain what it already does. This is perfectly predictable, perfectly logical—and perfectly wrong.

The way to implement an innovation so that it will transform an organization is to implement it disruptively—not by using it to compete against the existing paradigm and serve existing customers, but to target those not being served or not buying what's served—people we call non-consumers. That way, all the new approach has to do is be better than the alternative—which is nothing at all.

Disruptive innovations tend to be simpler and more affordable than existing products. This allows them to take root in simple, undemanding applications within a new market or arena of competition. Little by little, disruptions pre-

dictably improve. At some point, disruptive innovations become good enough to handle more-complicated problems—and then they take over and supplant the old way of doing things.

For computer-based learning to bring about a disruptive transformation, it must be implemented where the alternative is no teacher at all. There are many areas of non-consumption within schools where this is already taking place. For example, online learning is gaining traction in the advanced courses that many schools are unable to offer; in small, rural, and urban schools that cannot provide breadth; in remedial courses for students who must retake them to graduate; with home-schooled students and those who can't keep up with the regular schedule of school; and for those who need tutoring. Online enrollments are up from 45,000 in 2000 to 1 million today, as organizations like the Florida Virtual School and Apex Learning lead the way.

Although in its infancy, computer-based learning possesses certain technological and economic advantages over the traditional school model that should allow it to grow and improve rapidly. Not only does it provide accessibility for students who otherwise would not be able to take the course, but it also enables one to scale

quality with far greater ease. And as it scales, its economic costs should fall. In the United States, on average, it already costs less to educate a student online than it does in the current monolithic model. Furthermore, over time, computer-based learning can become more engaging and individualized to reach different types of learners, as software developers take full advantage of the medium to customize it by layering in different learning paths for different students.

Exciting possibilities are on the horizon for education. Employing a disruptive approach that is mindful of children's differences presents a promising path toward motivating students to maximize their human potential and realize their most daring dreams. ∎

CLAYTON M. CHRISTENSEN, MICHAEL B. HORN, and CURTIS W. JOHNSON are authors of Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns (McGraw-Hill, June 2008). The book applies the theories of disruptive innovation pioneered by Mr. Christensen, a Harvard Business School professor, to the education sector.

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