



Meeting Summary

Technology

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“Disruptive Innovation” Is Essential for Improving Education

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Clayton Christensen, the Robert and Jane Cizik Professor of Business Administration at the Harvard Business School, has long studied business models to identify the “innovation” factors that allow some corporations to succeed while seemingly similar enterprises fail. He was approached a number of years ago by education reformers who offered a proposition: If we teach you about the public education system, perhaps you can study schools through the lens of innovation. After 10 years researching the issue and publishing his findings in the 2008 book *Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns*, Christensen reports that the problem of improving education is indeed a problem of innovation.

Students “hire” schools to do a “job”

Citing management consultant Peter Drucker’s famous quote, “The customer rarely buys what the business thinks it sells him,” Christensen believes education is analogous to a “tool.” Student-consumers can “hire” this tool or service to perform the job of “education”. What do student-consumers want? To feel successful and have fun with their friends, says Christensen. However, instead of hiring a school to do that job, a student might choose to hire a gang, or hire dropout status, or select other options.

Christensen suggests the American school system is not doing its “job” because it is currently not designed to help students feel successful every day. Student motivation is weak because schools are improperly integrated into young people’s lives and values. In other words, instruction is not well-coupled with activities that help students experience success, and the trajectory of educational improvement is not aligned with what students experience. What’s one reason why schools are struggling to improve? Christensen asserts it’s because states have not managed well the evolution of the business model in public education.

“Disruptive innovations” almost always drive existing industry leaders out

Christensen defines a “sustaining innovation” as an improvement to a product already on the market. He proposes that a “disruptive innovation” is one that starts a completely new trajectory (for example, by the introduction of a new product on the market). This notion of “sustaining” versus “disruptive” innovations has clear implications for education reform. Christensen highlights the successive disruptive innovations from the mainframe computer (that filled an entire room) to the minicomputer (which was only as big as a podium), to the personal computer, notebook and, most recently, handheld computer. As each innovation comes onto the market, it is typically of lower cost and functionality than other available products, but provides a service previously inaccessible to consumers — so that disruptively innovative products essentially compete against no one, because they fill a void in the marketplace.

At first, mainframe computer makers were not threatened by the minicomputer because the innovation was not a product desirable to mainframe computer makers’ customers. However, as Christensen observes, companies entering the market with a disruptive innovation typically gain ground and often decimate the industry leaders. Exceptions to this have occurred only when a leader creates a separate innovative unit that is allowed to compete against the main business unit. This is how IBM became the only mainframe company to survive the mainframe era — it set up a minicomputer division. When the personal computer disrupted the minicomputer, IBM was the only minicomputer company to establish a

personal computer division, with a business strategy independent of the parent company's. Corporations with the will to survive, in other words, set up new business entities and shut down old ones, rather than expecting structural changes within the existing business model.

Greater customization of instruction would improve student learning

Christensen also draws parallels between product design principles and the delivery of education. An "interdependent architecture" means the design of each component relies on the design of every other component of the product (i.e., Microsoft Windows, where a change in one line of code requires a change in many other lines of code). "Modular architectures," such as Dell computers and the Linux operating system, allow components to work independently of the other components in the system and be added in or taken out.

This analogy has implications for the way we teach. In an independent architecture, a concept can't be taught in 10th grade if it builds on another concept that wasn't taught (or learned) in 8th grade. Because interdependent architectures are so expensive to customize, states are driven to more standardization in instruction and assessment. Yet in reality, differing student needs cry out for customization in the delivery of education.

The conflict between standardization and students' need for customization is a major barrier to learning and/or learning efficiently. Asking teachers to customize instruction for all is nearly impossible, because there are too many diverse needs in the classroom. However, if software is used to deliver content, suggests Christensen, this conflict can be mediated in a way not previously possible.

Technology has the potential to "disruptively innovate" the delivery of education

States and districts have spent billions of dollars bringing computers into schools, but they have been brought into the system as a "sustaining" model of disruption, and have not greatly changed the education model. However, just as disruptive innovations in business provide consumers with a product or service that serves a purpose because it's better than nothing, computers are succeeding in areas such as credit recovery, Advanced Placement and homeschooling, by making content available to students who previously had no access to it.

An opportunity

As school boards have been driven by budget conditions to force limited fiscal resources into the "more profitable" core courses that all students must take, the less frequently-taken courses (i.e., foreign languages) have been the first to be offered electronically, followed by courses more students take (i.e., economics). This creates an opportunity for disruptive innovation.

Christensen notes that the market's adoption of a disruptive innovation always follows an S-curve pattern — a gradual taking root, then a period of rapid growth, then a plateau.

When an S-curve is calculated as a mathematical function on a scale of 10 (so that .001, .01, .1, 1.0, 10.0 are all equidistant) and plotted on a graph, the result is always a straight line, allowing one to predict when a disruptive innovation will achieve 50%, 90%, etc. of the market share. If one looks at the trajectory of student enrollment in online courses in the secondary grades as one example of disruptive innovation, it creates a striking projection. At the beginning of the decade, just 2% of secondary grades courses were offered electronically, but by 2014, 10% of all "seat miles" will be online, with half of all secondary grades courses being offered online by 2019.

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