



The Internet of Things: Unprecedented Collaboration Required

In this issue of *EDUCAUSE Review*, the predictions about the growth in the number of connected devices that make up the Internet of Things suggest a potentially dizzying pace of change. And it's a familiar story. In my last Homepage column, I shared the story of an editor who just barely caught herself before sending a thank-you note to a computer-generated assistant. The same week that issue of *EDUCAUSE Review* was published, a similar story broke in the higher ed IT world: most of the students in a computer class didn't know that their teaching assistant, "Jill Watson," was not a real person. In one telling statement, a student recounts that she grew suspicious because Jill Watson "responded so quickly." Artificial intelligence services are maturing rapidly even while many of us are still trying to figure out how best to use Siri on our iPhones, and in this same way, the Internet of Things will surround us before we know it.

In "The Internet of Things: Riding the Wave in Higher Education," a panel of industry experts considers the speed, depth, and breadth of the IoT, paying specific attention to the potential impact in higher education. For example, TJ Costello, Director IoT for Cisco U.S. Public Sector, suggests that campuses might benefit from the innovations of "smart city" pioneers and recommends creating a "connected campuses" vision that can be accelerated by partnerships with industry. Bob Nilsson, Director of Solutions Marketing at Extreme Networks, envisions the IoT creating "dramatically improved" virtual classroom experiences for students taking classes from a distance. His evocation of "the images, the sounds, and even the smells" that can be conveyed by the IoT shows the sprawling vision for the higher education IoT. Some commentators focus on the IoT as activity monitoring—using smart lights, smart locks, smart HVAC systems, and other smart things. Likewise, fitness bands can gather data on students' pulse and body temperatures. Other commentators, like Nilsson, elaborate on the teaching and learning dimension. For instance, student brainwaves could even be measured to track cognitive activity during class. Maggie Johnson, Director of Education and University Relations at Google, is also excited by the IoT opportunities relative to teaching and learning and points to the "living lab" at Carnegie Mellon University and the promising academic research under way.

In their remarks, Chalapathy Neti, Vice President for Education Innovation at IBM, and Itai Asseo, Strategic Innovation Executive at Salesforce, include compelling observations about two themes that come up repeatedly in IoT discussions: (1) the vast amount of data and (2) the concomitant security and privacy risks. Neti goes so far as to suggest that whereas the 29 billion connected devices anticipated by 2020 (according to one estimate) will produce vast amounts of data, 90 percent of that data will not be visible to traditional computing systems. Of course, what happens to this data is of great interest to colleges and universities, which are already inundated by data in general and private personal information in particular. The potential for the IoT to dramatically improve living and learning on our campuses depends on our ability to analyze that data through an IoT platform. Neti sees great opportunities at the intersection of all this data and cognitive neuroscience, machine learning, and psychology. However, Neti also recognizes that "security is at the heart of IoT success."

Speaking to worries about security and privacy, Asseo underscores the connection between the IoT's attraction (functionality) and the IoT's detraction (privacy concerns), using the example of Disney World's MagicBand. The IoT functionality that allows people to tap their band and pay for things or make restaurant reservations at the resort generally outweighs its privacy detraction and thus seems "magical rather than creepy." This magic-creepy spectrum must be attended to as the IoT begins to materialize around us in higher education. "Having all the data about a user's information across different areas—to be used for personalization—brings up the risk of an experience that invades privacy and a certain personal space. That intrusiveness can be tolerated only if the value of that interaction exceeds the perceived cost of giving up some privacy."

The corporate panel discussion captures the vast complexity of opportunities and challenges related to the IoT. Chuck Benson, Assistant Director for IT, Facilities Services, at the University of Washington,

follows up with a concrete consideration of what the higher education community should be doing to ensure the thoughtful implementation that he sees as crucial to maximizing the benefits of the IoT and minimizing and managing the risk. Benson's analysis concentrates on five distinguishing factors of the IoT and on how campuses can and must develop new capabilities to deal with all that is new, especially related to vendor strategy and relationships. Benson acknowledges the difficulties at this early stage, pointing out: "Since we don't know what is going to happen next in IoT innovation, how do we establish strategy?" After suggesting directions, he stresses that even though any IoT strategy or policy developed at this early phase will necessarily be imperfect or incomplete, "the cost of not having one is much higher." Finally, Benson stresses the need to identify the risk around the IoT, to begin the important but challenging work of "socializing the idea of IoT risk," and to understand IoT risk in the context of other, already existing risks.

As the various voices in this issue of *EDUCAUSE Review* make clear, the challenge with the Internet of Things is not just the number of things but also the number of people and players. Higher education, living very much at the intersection between technology, people, and processes, can do much more than scan the horizon. In fact, in her Viewpoints column Florence Hudson, Senior Vice President and Chief Innovation Officer for Internet2, insists that "the higher education community can lead the development of the technologies, business models, ethics, and leaders of the IoT-enabled world." For the Internet of Things to add value to the world of higher education, unprecedented collaboration between all those involved—not just colleges and universities but also the industries that support higher education institutions—will be crucial in the sea change ahead.

Note

1. Melissa Korn, "Imagine Discovering That Your Teaching Assistant Really Is a Robot," *Wall Street Journal*, May 6, 2016.