Change and the Research University

James J. Duderstadt chaired the U.S. National Academies Panel on the Impact of Information Technology on the Future of the Research University and currently serves on the National Academies Committee on Research Universities. He recently talked with Gerry Bayne, EDU-CAUSE multimedia producer.

Bayne: How do you see information technology as a game changer within higher education?

Duderstadt: Universities are knowledge institutions, and information technology, broadly defined, reshapes the way that knowledge is generated, the way it’s passed on through learning, and the way it’s applied. This is a disruptive technology, in the words of Clayton Christensen, and one that will affect almost everything that involves universities. In fact, several years ago I was asked by the National Academies to chair a major effort to try to understand the impact of information technology on the future of research universities.

As we worked our way through this issue, our sense was that because this is a technology that is accelerating very rapidly in power, it is reshaping universities in ways that we don’t really understand and, in particular, in ways that university leaders frequently don’t understand. The first phase of our effort was a 2002 report entitled Preparing for the Revolution: Information Technology and the Future of the Research University. That report received some attention, but not as much as we would have liked from university leaders. And so we moved to a second phase, in which we pulled together the leaders of several peer institutions. We had each institution’s president, provost, chief financial officer, CIO, and maybe a dean or two join with four or five other sets of institutional leaders in a moderated discussion, over a day and a half, about how they saw the future.

One of the ways we got their attention was to start off with a simple question, such as: “How many of you are building libraries these days?” Of course, all the presidents quickly raised their hands. We then followed with: “What are you going to put in these new buildings? You could put books in them.” They answered: “No, probably not. We’re going to leave the books in high-density storage off campus.” We kept pushing and asked: “Well, what will you put in the libraries?” The usual answer was: “We’ll have resources where students can come together and can learn.” After pushing a good deal more, we discovered that the only common denominator for the libraries was Starbucks. That is, the institutional leaders were using coffee shops to lure the students into these facilities—moving from “stacks to Starbucks.”

In many ways, the extraordinary changes occurring in the library represent the wider changes that are occurring throughout universities these days.

Bayne: What role can information technology play in reinventing the research university?

Duderstadt: Information technology has already played a large role here. For example, scholars—including physical scientists, social scientists, and others—rarely interact directly with measurement today. Sensors are coupled or are collected digitally, whether in an observatory or a laboratory, creating enormous quantities of data. That data is increasingly analyzed by technology, through trillions of transactions per second, to establish correlations before being presented for analysis by human beings. The massive effort to identify the Higgs boson at CERN is an example of how everything involves computing in one form or another before the final judgment of people comes into the equation.

Furthermore, the kinds of communities that form for scholarship now extend far beyond the boundaries of the campus. Again, using CERN and the Large Hadron Collider as an example, the ATLAS and other experiments running on that accelerator typically have 3,000 or more physicists working together from around the world. Sometimes they work physically together in Geneva, and sometimes they interact while being distributed around the world. In fact, most of my colleagues interact much more with people on the other side of the globe than they do with people across the hall. This will have a significant impact on the way the university organizes itself; the traditional boundaries between disciplines have been obliterated because much of this work is highly interdisciplinary. Furthermore, this trend has created faculty members who are increasingly nomads. They can move anywhere, and they frequently do, as long as they have access to the cloud of data that they use.

All of this is changing not simply the campus as an entity but the culture of the institutions themselves.
Bayne: What effect will universal access to knowledge have on universities?

Duderstadt: Even though universities have existed since medieval times, they have changed in remarkable ways, sometimes very rapidly. These institutions do adapt very readily to the needs of society. But in addition, institutions change in highly diverse and different ways.

For example, the concept of community colleges was largely unheard of and even unthought of before the Second World War, but with the postwar baby boom they began to play a key role. What we used to call “junior colleges” evolved into colleges that were primarily educating adults in the communities where they resided. The concept of research universities also took off after the Second World War.

Today we are seeing new kinds of institutions: universities that do not have physical campuses but that operate in cyberspace; universities that have a for-profit model and, through mergers and acquisitions, have become global in character (e.g., Laureate Education, Apollo Group).

Do some types of institutions disappear? Yes, they do. I think small independent colleges will be particularly challenged right now because of their financial structures. In addition, whether the big, complex institutions can maintain worldwide quality and capacity is a very serious question today.

The bottom line is that we live in a time in which the drivers of prosperity are primarily the innovation that comes from generating new knowledge and the people who are educated to increasingly more sophisticated levels.

Bayne: How can university presidents and IT leaders work together to help facilitate this reinvention?

Duderstadt: It’s a challenge. When we were doing our studies for the National Academies, the typical first response of university presidents or CFOs or provosts was to say: “I understand things are changing very rapidly, but I’ll ask my CIO to take care of it. The CIO usually can.” We would then ask: “Suppose you wake up in the morning and come in to your office and nothing works anymore. You can’t access e-mail. All of your course systems have collapsed. Who fixes the problem?” They begin to scratch their heads, and pretty soon it’s like the five phases of grief. They start off with denial and anger, move through bargaining and depression, and finally reach acceptance.

I think presidents are becoming more aware that information technology is intertwined with many important strategic issues for their institutions: finances, capital facilities, lifelong learning, globalization. Still, there is the open question of how do they address these issues. I serve now as a member of another National Academies commission looking into the future of the American research university. We will be releasing our final report this summer. Once again, the theme is change—change that will likely affect these institutions in very profound ways. Part of the challenge for university leaders is to develop strategic processes for understanding not only this change but also the opportunities it creates.

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