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DELIVERING Value BY PRESERVING Values

AN INTERVIEW WITH



DOUGLAS VAN HOUWELING

Douglas Van Houweling, President and CEO of the University Corporation for Advanced Internet Development (UCAID), the formal organization supporting Internet2, received the 2002 EDUCAUSE Award for Excellence in Leadership. This lifetime-achievement award honors extraordinary influence, statesmanship, and effectiveness both on individual campuses and within the higher education community. Van Houweling filled key information technology leadership positions at Cornell University, Carnegie Mellon University, and the University of Michigan from 1978 through 1996. He also has played a major role in Internet development in the United States. He was chairman of the board of Merit, a Michigan statewide computing network, when the National Science Foundation (NSF) awarded it responsibility for operation and management of the NSFNET national backbone in partnership with IBM, MCI, and the Michigan Strategic Fund in 1987. Van Houweling was also chairman of the board of Advanced Network & Services Corporation, a not-for-profit organization that implemented and operated the world's largest Internet backbone network from 1991 until 1995. Van Houweling has been active in numerous inter-university initiatives and served on the Educom board. He was a founder of Educom's Networking and Telecommunications Task Force and the Inter-university Consortium for Educational Computing. He served as a member of the National Academies Panel on the Impact of IT on the Future of the Research University and continues to serve as a member of the Forum on IT and Research Universities. With James Duderstadt and Daniel Atkins, he has authored *Higher Education in the Digital Age* (2002).



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Q: How did your career in higher education information technology begin?

Van Houweling: My first IT position in higher education was at Cornell University. I was an assistant professor of government in the 1970s, and in those days I was also one of the few Government Department faculty members who thought you could use computer models to do interesting scholarship about politics. As a graduate student at Indiana University, I had used computers quite extensively in my research. In fact, the Control Data mainframe there was my first personal computer—I arrived in the wee hours, turned on the whole roomful of equipment, and used it for my research until it was time for breakfast! So Cornell probably hired me because I was different.

The immediate payoff was that I was given an opportunity at Cornell to innovate in some exciting ways, including working on some pretty sophisticated computer-intensive models. At the time, there wasn't much going on in the classroom using interactive computing. A group of us created a course called the Urban Affairs Laboratory. It allowed eighty students to run a simulated city for seven years during the fourteen-week semester. The students loved it. They learned about urban affairs, of course, but they also learned how to collaborate with one another. They learned how to achieve common objectives even though they disagreed about the required processes. I became convinced that computing technology offered enormous value to the university—not only in research but in teaching as well. However, I had a problem. The technology that I was using wasn't adequate for the task. So in 1976, I took on an additional responsibility as Assistant Director for User Services. By 1980, I was directing Academic Computing and

Central Computing Services at Cornell.

Looking back, I see that my first experiences with information technology set a framework for tying *value* together with *values*. We verified that computing technology—remember, these were the early days—was valuable for education as well as for research and scholarship. At the same time, a set of *values*—foremost among them, collaboration—informed our work in information technology.

Q: Speaking of collaboration, you mentioned that there was a group working on the Urban Affairs Laboratory course. Who worked with you on that?

Van Houweling: I've always been very lucky to be accompanied by some extraordinary colleagues, some of whom I hired. I never thought of them as employees or staff.

Dan Updegrove and I collaborated in developing the Urban Affairs Laboratory. Dan, who is now Vice President for Information Technology at the University of Texas, taught me quite a lot. He was the one who encouraged me to publish my first article on information technology, in 1979 in the *Educom Bulletin*, in which I made the incorrect prediction that the steadily declining costs of technology would lead to a computing services budget dominated by personnel costs. In any case, I got into trouble because I talked about Cornell University and my boss didn't know about the article in advance. I was thinking like a faculty member. Faculty members just write things and publish them. My boss said, “If you're going to write about computing services at Cornell, you'll need to clear that with me first.” So I asked for forgiveness, which is something I've done quite a lot since then. And I learned one of the differences between being a faculty member and being a member of the administration.

Steve Worona also worked with me at

Cornell. E-mail was a rarity at the time, but Steve understood its potential. So he wrote a set of CMS macros for the IBM timesharing system that served as campus-wide e-mail at Cornell. Steve is now the EDUCAUSE Director of Policy & Networking Programs.

Interactive computing was at the heart of the Urban Affairs Laboratory course. Further, e-mail required it, so we needed to enable the timesharing system to serve hundreds of simultaneous users. Bob Cowles, an extraordinarily talented systems programmer, wrote some code called the Cornell Scheduler. It allowed us to continue to support the faculty's research while hundreds of students simultaneously used the computer. He installed about 20,000 lines of code right in the guts of the CMS computing environment. To the best of our knowledge, we never had a crash because of that code.

At the same time, Digital Equipment Corporation came out with the minicomputer. Scientists were putting these mini-computers in their labs to do computing. Of course, most of the mainframe folks were not too happy with that. At Cornell, we decided that it was important to serve people who had these kinds of computing environments. Alison Brown helped me understand that and establish a new office of decentralized computing. There was a young physicist in Texas, Doug Gale, whom we hired and brought to Cornell to create and maintain that facility. Doug has gone on to be CIO at several universities. Most recently, he has been leading OARnet, the Ohio Academic and Research Network.

At this time, Ken Wilson was a star young physicist at Cornell. When I visited Ken at Cal Tech during his sabbatical, we spent an entire evening benchmarking a new computer back at Cornell because Ken wanted to see how fast the double-precision floating-point multiplier

instruction worked. The next morning we hiked up the San Gabriel Mountains. We started off at daybreak and didn't get back until twilight had fallen. All the way up the mountain and most of the way down, I was being told about how Cornell Computing Services could deliver affordable supercomputing using a floating-point array processor attached to the mainframe computer. Well, Ken later went on to win the Nobel Prize. We had an affordable supercomputer environment at Cornell, and he used it to do the computations that led to the Nobel. And Ken led the effort to establish the NSF's supercomputing center program. So even though I was anoxic when I made the decision, it was a good one!

The support for decentralized computing and Ken's work reflected a custom of Cornell's computing service organization, one that predated my time there: the organization would bring in the users and talk to them about what would provide them value. This custom created an effective environment for encouraging creativity and for meeting the users' needs.

And again, values played an important role in guiding the work at Cornell. In addition to collaboration, the two values that were most important to us there were maintaining openness and continually pressing the frontier.

Q: Where does networking emerge in the work you've done, and how does it relate to the values you've mentioned?

Van Houweling: Actually, networking of several types first turned out to be important during my time at Cornell. Ken King, whose tenure overlapped with mine at Cornell and who would later serve as President of Educom, used to say that Cornell was "centrally isolated." At the urging of one of my undergraduate assistants—a fellow by the name of Michael Kaplan, who also helped us with the Urban Affairs Laboratory course—we formed a unique computing partnership with Hamilton College. We networked, in the electronic communications sense, Hamilton College to Cornell and shared the benefits of the com-

puting environment we had developed at Cornell. We also joined Educom. We wound up hosting computing services for the National Bureau of Economic Research. Jim Emery, then President of Educom, encouraged me in these initiatives to connect Cornell to the rest of the world.

These activities reinforced my realization that collaboration could extend beyond institutional boundaries and my understanding that collaboration was in itself a positive value. It enabled us to move forward by reaching beyond the capabilities of our local environment. Now, this was contrary to my background as a faculty member. As a faculty member, your thought is, "Do it yourself; you're responsible for it." But of course, the instant you need to do something that requires more than you can do yourself, you have to share responsibility.

Q: How did the emergence of the personal computer affect your view on the development of information technology in higher education?



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Van Houweling: In 1980 Dick Cyert, President of Carnegie Mellon University, decided that every student ought to have a personal computer. He stated this vision on the front page of the *Chronicle for Higher Education*. That idea doesn't seem so radical now, but it was then. Our work at Cornell had already focused on distributed computing and microcomputers, so Carnegie Mellon asked me to take the job of Vice Provost for Computing and Planning. It was an interesting move for me. I was going from a large to a small institution. I learned that a small institution could be extremely agile.

At Carnegie Mellon, we became convinced that computing technology could provide value to an academic community by bringing people together in productive environments. Stand-alone computers wouldn't do that. In fact, I used to say that “a personal computer without a network connection is active evil.” That led us to quite a different vision from “a computer for each student.” Based on this notion about the value that computers could contribute to the students and the faculty at Carnegie Mellon, we set out to build an environment that not only enabled people to use personal computers but also linked them together. We talked to many computer companies: Apollo, Data Point, Digital Equipment Corporation, Wang, Radio Shack, IBM, and Apple. In the final analysis, helped enormously by IBM Chief Scientist Lew Branscomb, we decided to partner and develop a set of capabilities in collaboration with IBM. The result was the Andrew Project at Carnegie Mellon.

Two faculty members, Mike Levine and Howard Wactlar, a physicist and a computer scientist, worked with me to define the Andrew Project. Jim Morris led the project. Allan Newell, who was a preeminent artificial intelligence expert and computer scientist, facilitated the liaison with the Department of

Computer Science and helped recruit Jim Morris. Jim Gosling, now at Sun, wrote the user interface for the Andrew software environment. The project took advantage of the combined resources of the Computer Science Department, the IBM Research labs, and the Information Technology Center at Carnegie Mellon.

Collaboration manifested itself in yet another way on the Andrew Project. I think this was the first time that I really became familiar with the notion of “cooperation,” where you *cooperated* with and *competed* with people at the same time in order to get the best out of your talent. There were other projects similar to the Andrew Project, such as Project Athena at MIT and the Scholar's Workstation Project at Brown. Each of these projects embodied its own form of cooperation.

I think this may have been the first time since the development of mainframe-based timesharing that the higher education community worked with industry to shape the information technology future that the rest of the world would end up using. This was not only about what was needed on campus. The basic assumption of the folks at IBM, Digital Equipment Corporation, and Apollo was that the future would be seen first at the research university and that they could learn from that experience.

The values we focused on at Carnegie Mellon were anchored by promoting the notion of universal access and further reinforcing and supporting collaboration.

Q: You were at the University of Michigan when the NSFNET was formed, another example of the higher education community leading technology development. How did that come about?

Van Houweling: I was attracted to the University of Michigan because much of

the work being done to push frontiers in information technology had taken place only in the elite private institutions. I had this feeling that somehow we needed to bridge the gap and do the same sorts of things in a public institution. Then it wouldn't be possible for people to say, “Ah, but you're MIT,” or “You're Carnegie Mellon,” and sort of wave off the applicability of the innovation to other colleges and universities.

In 1984 I went to the University of Michigan as Vice Provost for Information Technology. At Michigan, we extended the idea of universal access to networked personal computing as the value that we delivered. Remember, by now the notion that personal computers could be networked was not so novel. This was at the time when computing was making the move from using computers to do computation—grinding up numbers—to using computers to access information and secure it for personal use.

To make that transition, we knew we needed to deploy a network that reached not only people on the campus but also colleagues all over the world. Only then would we have created a learning environment that would meet the full range of scholarly pursuits. Harold Shapiro was President at Michigan at that time, and Billy Frye was Provost. They were deeply committed to the notion that libraries and computers were fundamental to the future of higher education. In addition to its computing system, the University of Michigan also had the Merit network. It turned out that this foundation made it possible to bring Merit together with IBM, MCI, and the State of Michigan to create NSFNET.

At the same time, unlike my previous experience at other institutions, Michigan was extraordinarily diverse, gathering all kinds of people together. The result was that we focused very much on



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how to use the diversity of our community to achieve our objectives. It was amazing how often I discovered that there was an individual who wanted to play a serious and important role in our work but who maybe hadn’t had that opportunity before because people had stereotypes about who could do a particular type of work. As a result, we learned how to distribute leadership across the campus. Dan Atkins, Alan Merten, and Randy Frank were all engaged in these efforts early on with the College of Engineering and the Business School. They worked together to help us build the institution-wide environment. I discovered that empowered people, working together in the right organization, could do

almost anything. So, NSFNET was fundamentally built on collaboration.

I also learned one other lesson: CIOs operating in today’s environment must have the commitment of the president and the provost for continued success.

Leadership as a value in itself informed the work we did at the University of Michigan. Whether it was Harlan Hatcher, Robben Fleming, Harold Shapiro, or Jim Duderstadt—all presidents at the University of Michigan—each believed that the key mission of the university was to be a leader among public universities. The notion was that with an inspiring vision, an institution the size of the University of Michigan could do almost anything it set out to do.

Q: With the success of the NSFNET, why did Internet2 come to be?

Van Houweling: In 1995, the public Internet was taking off. E-mail and the Web—both the results of innovation within academia—were spreading unbelievably quickly not only within higher education but also in industry. Businesses were beginning to produce products and services built on top of Internet technology and to tap into the technology itself. Somewhat to our surprise, the Internet service needs of the public and business communities focused on performance characteristics different from those of NSFNET, and the research and higher education community discovered



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that it was unable to buy what it needed in the marketplace.

At the same time, people like Mike Roberts at Educom, Gary Augustson at Penn State, Molly Broad at California State, and Anne-Lee Verville at IBM were forming an approach to developing and providing a high-performance networking environment to serve the higher education community. They, and other folks involved in discussions at that time, knew we needed to move ahead if we were going to sustain leadership, meet our goals, and partner appropriately with organizations within and outside of higher education.

As a result, the community conceived and built an organization that was fundamentally different because it was focused on being agile and responsive to the needs of higher education. David Ward, now President of the American Council on Education, served as the founding chair of the board. We worked hard to enable the community—including companies and government—to work together to realize the potential of high-performance networking. Ted Hanss and Tom De Fanti led our efforts in the applications area. Ken Klingenstein brought us the middleware environment. And Larry Landweber and Guy Almes, from the very beginning, said to us, “The computer science faculty needs to be involved in this effort so that we can use it appropriately for research.”

One of the first steps we took was to build a national high-performance network called Abilene, which Terry Rogers (now President and CEO of Advanced Network & Services) and Michael McRobbie (Vice-President for Information Technology and CIO at Indiana University) helped pioneer. Today, of course, we have over 200 universities across the nation collaborating and almost 3,000 schools, colleges, libraries, and museums being served by the Internet2 infrastructure.

There are a few fundamental values at the heart of how and why Internet2 began, and they continue to sustain the work of the Internet2 community. Openness is a major one. For example, everything about our network is out there for people to see—completely unlike most commercial networks. Another value, again, is collaboration, including the notion that all in higher education must work together to accomplish its goals. People from all over the country are collaborating in Internet2 councils and boards, projects and working groups, so distributed leadership is crucial as well.

Perhaps as important as anything else, we continually focus on doing what’s right for the Internet, along with what’s right for our members. So we bring industry, government, our international partners, the rest of higher education, and the K–12 community together to collaborate on this effort. And we now have an environment, a community, that includes important actors from all of these sectors.

We learned some lessons along the way, and we are still learning. The first is that agility is important. It’s important to have an organization that can move and do new things together with its colleagues around the country. Listening and responding to the community is a requirement. And listening has to be done in the context of the understanding that higher education occasionally has the capability to invent the future.

Q: What do you see ahead for information technology in higher education?

Van Houweling: The Digital Age has raised questions about privacy, freedom of information, and intellectual property—just to name a few issues. We have to deal with the tension between *delivering value* and *preserving values*. We need to always remember and question the core

values that have sustained us in higher education and discover how those values can be applied in new ways to help us continue to advance society, to add value.

Dealing with these issues and challenges requires us to build learning organizations—not only in the sense of classroom learning but also in the larger sense of organizations that learn from and build upon our achievements—and to think about what that learning means as we go forward. I think a key to being able to engage in that activity is to draw a mental roadmap of the future. It’s a continuous and, I believe, collaborative effort.

With Internet2, we learned how critical it is to focus on the possibilities rather than the barriers—to explore what we can do together. It is terribly important to imagine what can be done instead of spending time thinking about what can’t be done. We have already seen a lot of change, of course. I don’t think anyone can imagine what’s really going to come tomorrow. But I do think there are questions we need to raise and issues we need to think about as a community.

We must find a way to share a common vision of the future. Coalitions, no matter how hard they are to assemble and no matter how much they include competition as well as cooperation, are energizing. Collaboration is extraordinarily important for our success. The richest moments of my career have come from the surprising results of collaboration—sometimes among very unlikely partners. We must never forget that empowering people to work together is critical to success.

How is it that we move from individual endeavors to collaborative efforts, developing a world in which we not only envision but also create the future? Again, I think *value* and *values* need to be considered together. We need to understand the value of what we do for our institutions and for the world. But we also need to keep in mind that our job is to create

value in the context of the values of our organization. Especially in periods of economic constraint, we're sometimes tempted to compromise our values in our efforts to create value. In my experience, the short-term gains from such compromises are often illusory, and the long-term costs can be enormous.

We must have an environment of trust before information technology can help people work together. Can we build an information technology environment that allows people to trust one another when they work together? If we're thoughtful about how we do middleware, how we share information about identity, and how we allow people to connect, see each other's faces, and work together across a distance, I'm convinced that we can do much with information technology to create an environment of trust, one that will allow us to more easily maintain a commitment to our values.

We have the potential today in the higher education community to implement a model of information and knowledge sharing that will support how the world works and learns in the future. I'm not referring here to how we work and learn inside our colleges and universities—we're already supporting that. I mean how the *world* works and learns. Higher education is in a position to draw the roadmap for this future and is in a position to create the examples for how it can be done. But to reach outside our institutions, we need to build our capabilities—not just the technologies we develop, such as networking, middleware, or applications, but also the value we deliver to the global community using all of the tools our institutions are already exploring. Our core values should motivate and energize this effort.

I'm an optimist. I believe that if we keep our eye on the *value* we deliver and the *values* that guide us, we can do all of this. We need to preserve the values and the principles that are so important to our institutions—especially the values of academic freedom, a rational spirit of inquiry, a community of scholars, a commitment to excellence, and an understanding that we can do so much more together than we can do independently. *e*