

# past is prologue



In late 1999, EDUCAUSE awarded its first Excellence in Leadership Award to Mike Roberts, President and CEO of the Internet Corporation for Assigned Names and Numbers (ICANN). During his long career in both the educational community and the larger public policy arena, Mike has embodied the qualities honored in this award: extraordinary effectiveness, influential innovation, statesmanship, and thought leadership in the field of higher education information technology. He was deputy director of information technology services at Stanford, helped found and served as the first president of CAUSE, and worked with Educom as vice-president for networking from 1986 until his retirement in 1997, including a term as interim president. He also strongly influenced NSF investment in advanced networking, organized and was the first director of Internet2, and was one of the founders and was the first executive director of the Internet Society. Earlier in the year, EDUCAUSE Vice President Mark Luker sat down to talk with Mike about his role within and his views about higher education information technology.

## an interview with mike roberts

COLLAGE BY GLENN PIERCE

BY MARK LUKER

**MARK LUKER:** Mike, I'd like to thank you for agreeing to this interview. On behalf of EDUCAUSE, I congratulate you on receiving the Excellence in Leadership Award. Over your career, you've helped those of us in the IT field move forward very effectively over a number of large changes, not just in information technology but in the way our campuses and in fact our global institutions operate. We're indebted to you for your leadership.

**MIKE ROBERTS:** The recognition of colleagues is one of the highest forms of professional praise. I am very pleased that EDUCAUSE and its members, the campus IT leaders, chose to honor me with this award. I value it highly and hope that it can serve as an inspiration to new leaders who are entering the field and will be guiding us through the next stages.

**LUKER:** I'd like to ask you a little about your leadership activities—past and present—and about some of your ideas for the future. First, how did you get started in information technology?

**ROBERTS:** After the usual military stint that we all went through in the middle of the cold war, I spent some time in industry and then attended Stanford Business School. At the time I was graduating from Stanford Business School, the university was setting out to build its first professional management team, and I was recruited into the finance organization in 1965. Shortly after that I became part of a big project to computerize the university's financial and accounting systems. That led to an opportunity to head the MIS unit and subsequently into a career in university computing.

**LUKER:** You were one of the founders of CAUSE and in fact became its first president in 1971. What was IT all about at that time? What was the mission of CAUSE?



**ROBERTS:** There was a major inflection point in college and university information technology in the mid-1960s when IBM announced the 360 computers. Prior to that time, computers in university administrations were largely just high-class tabulating machines. With the 360 machines, all of a sudden we had to stop and think about how we were going to use computing and not just data processing of the tab-card variety. In other words, we had to have a fundamental reset about what our jobs were. CAUSE grew out of a series of meetings of people in an IBM users' group—people who presided over large data-processing operations that had to support campuses with 50,000 to 70,000 students. We needed to find a way to create an organization that would

*Mark Luker is Vice President of EDUCAUSE.*



foster collaboration and information sharing so that we wouldn't have to individually pursue new strategies based on the then revolutionary computers that IBM and UNIVAC and Burroughs were selling us. Everybody was busy rewriting existing computer programs to run on the new computers, without being exactly sure what we were going to do next.

Our original planning was that if we could get one hundred schools to join CAUSE, we would have a sufficient critical mass to go forward. So

the initial steering group started a sign-up process, and in relatively short order we had expressions of interest and commitment from I think it was ninety-two schools. We then decided to incorporate in Colorado, to establish our original office in Boulder, and to hire Chuck Thomas, from John Chaney's department at the University of Illinois, to be the first executive director. From the original name, which was an acronym for College And University System Exchange, we focused on

all benefit from learning about each other's design approaches and implementation approaches and would thereby increase the professionalism of what we were doing.

**LUKER:** Did that work according to plan?

**ROBERTS:** It's very nice today to look back and see that CAUSE grew from that core of less than 100 schools to over 1,400 some twenty-eight or twenty-nine years later, at the time of the merger with Educom in 1998. If a judgment could be rendered on the fact that similarly minded individuals from a wide range of institutions thought it was worthwhile, then CAUSE was a success.

**LUKER:** You also served as the interim president

of Educom in 1986–87. How did you get started in your association with that organization?

**ROBERTS:** I had known leaders in Educom, which began primarily as an eastern university organization for academic computing. My direct involvement with Educom started when I had completed a major telecommunications project at Stanford in 1986. I had worked very hard for three years and was looking for a little bit of relief. My boss, Ed Shaw, who was on the Educom Board of Trustees, asked me whether I'd be willing to serve as the first vice-president of networking for Educom, so I spent the academic year of 1986 at Princeton in effect starting up that job at Educom. The success of the Educom Networking and Telecommunications Task Force and our ability to subsequently move to Washington, D.C., and be effective in the policy development of the Internet and academic networks in general was due in part to the resolve of the Educom leaders—their willingness to find the resources to fund a staff position and supporting staff—and in part to the fact that when we moved to Washington in the late 1980s, there was considerable interest in what university people knew about networking and in how that knowledge could be effectively applied to policy formulation about networking in the Washington environment.

**LUKER:** By moving to Washington, Educom had close access to decision-makers in the government agencies as well as in Congress and the White House. What was your role in these policy activities? Why was there a need for policy in IT?

**ROBERTS:** As is usually the case, there was more than one reason. Congress was aware of and had funded computing and networking technology for research for a number of years. What was beginning to become clear to people like George Brown of the House Science Committee, Al Gore of the Senate Science Committee, and other members of Congress and certainly to the leaders of the research agencies—people such as Eric Bloch and Gordon Bell at the National Science Foundation (NSF)—was that the promise of this networked computational environment for research was also extremely high for the nonre-

search activities in education; the learning and to a lesser extent the administrative, nuts-and-bolts infrastructure of how universities operated. What was lacking was an organized vision of how to take what had been primarily a research activity pursued by research faculty on entirely government-sponsored project funding and transport that into the regular workings of teaching and learning on campus. No one had a precise game plan, but we had some very good ideas, the major one being an agreement that the NSF should create a general-purpose academic network on a joint-venture basis with both industry and the educational institutions. Thus the provision of the network backbone of what became NSFNET was a joint venture of the NSF, MCI, IBM, the state of Michigan, and the University of Michigan. The partnership that was created, however, was actually much larger than that because in fact what the NSF had the great wisdom to do was to seed regional and primarily campus-based structures on a matching-grant basis so that the institutions, if they were willing to accept a commitment to advance the state of general-purpose academic networking and computation, could get substantial funds, normally one-half or more, from the federal government to put the actual network infrastructure in place and to get it connected to the backbone. This was very new thinking. It was revolutionary and somewhat subversive thinking at the time, and of course over a two-to-three-year period what it did was take academic networking from being an essentially sponsored, principal-investigator activity at fifty or sixty colleges and universities and move it to over one thousand institutions and dozens of disciplines.

Looking back on it now with the benefit of history, NSFNET also did several other things. It demonstrated to a lot of doubting Thomases in the commercial data-processing industry that there really was a market for Internet-style networking. When we started NSFNET, the telephone industry thought that we were doing something pretty dumb. So we demonstrated that there was a market out there, and we laid the foundation for the notion that not only was this good for research, not only was it good for general-purpose academic computing, but by gosh it

was good for everybody. In particular, the relatively rapid and glitch-free expansion and operational success of NSFNET was so substantial that the opposition from the established monopoly telephone companies just melted away. There was no way to deny that this didn't have commercial utility and commercial viability when a thousand universities and colleges were using it all the time for a broad range of institutional needs and requirements.

**LUKER:** Why would NSF support the development of a network, however different, to connect campuses? How did that support its mission of research?

**ROBERTS:** At the time, the direction the NSF took in this area was considered very risky. Without two people at the NSF—Director Eric Bloch and Assistant Director Gordon Bell—I doubt that there would have been the institutional courage to do what was done. Of course, bringing Steve Wolff from Aberdeen to be NSFNET director also helped. Those three people deserve an enormous amount of credit for what we have today because they took unprecedented risks by NSF standards.

But to get back to the motivations, first of all research has always been about collaboration. The NSF and other federal research agencies have sponsored major collaborative efforts since Vannevar Bush's days after World War II. You look at the atmospheric sciences, marine sciences, the Antarctic program—these are all about very substantial academic collaborations. It was very obvious, particularly with the rise of academic super-computer centers in the early to mid-1980s, that the network was becoming an essential ingredient of effective academic research collaboration.

Second, the NSF has always attempted to level the playing field of opportunity for research among institutions, and the network was one of the major tools by which the peaks and valleys of NSF support of academic science began to be leveled a bit. The objective, of course, was not to drag down the steeples of excellence in research but to provide the tools and the capacity to bring everybody up to the highest standard of academic research work.

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**LUKER:** The NSF funded its national network, as well as the campus connections, for a short period of time, for only a few years. A campus would typically be funded for two years to make a connection. Why didn't the networks all collapse at the end of this funding?

**ROBERTS:** This was one of the risks, the creative risks, involved in putting the program together. Previously, when the NSF approved a research proposal, it provided the funds to put everything together—the people costs, the equipment costs, the facility costs, and any other related technology costs and related institutional overhead. In other words, the proposal was submitted as a package and the NSF funded the whole package. However, the network program involved an investment in infrastructure that would become enabling for projects on a very widespread basis, on a multi-institutional basis. This had the potential to divert substantial amounts of money permanently from the research budget, and there was great concern

that this was going to dilute and ultimately diminish the effectiveness of the research effort in the country because qualified and deserving principal investigators wouldn't be funded and the research that needed to be done wouldn't get done. So the premise of what became NSFNET and the Internet was that the role of the NSF and, for that matter, other research agencies was to seed the development and initial stages of the network and then, on an orderly basis, retreat from the subsidy role as the institutions took it up. Now, that was certainly conjectural and experimental in the mid- and later 1980s. Today it's an accepted, if occasionally painful, part of the way in which the federal government will help the university community with the deployment of successive

waves of innovation in this kind of technology.

**LUKER:** What was your role in the development of Internet2?

**ROBERTS:** Internet2 was the result of about two and a half years of fairly continuous dialogue, beginning in 1994, concerning what the networking environment on the university campuses needed to be in a post-NSFNET environment—in other words, in a post-heavily-subsidized academic Internet environment. This process involved advancing the technology, moving the leading edge forward—which is, of course, a challenge that Internet2 has taken up and is being quite successful in pursuing.

**LUKER:** In your most recent career move you are the chief executive of ICANN, which is an entirely different kind of organization. Can you tell us a little about that?

**ROBERTS:** Well, this was one of those accidental coincidences that have occurred many times in the history of the Internet. I was retired from Educom and doing a little bit of consulting but basically pursuing other things that had been on my life list. The decision of the government to privatize the Internet Domain Name System was of substantial concern to the educational community and to the people involved with Educom networking because although we were very much supportive of the general idea—we had in fact advocated that the Internet ought to make a successful transition to a fundamentally private-sector-driven type of infrastructure—we were very concerned about how the government would work out its good intentions. Bob Heterick, president of Educom, asked me to participate in the ICANN development process as a part-time consultant. Then when John Postel died at the critical juncture of the beginning of ICANN, it was very difficult for me not to agree to the request that I become the start-up chief executive. Basically what ICANN is doing, what I am doing, is becoming the mechanism by which the community achieves self-governance on those functions that are related to the Domain Name System and that are an important technical management compo-



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nent of the network. In other words, we have a limited charter to perform a critical set of functions and to ensure that they get done right, and we’re working with the community to provide the resources—the money and the people and the program—to make that happen. We’ve had a very stormy start-up as a result of the fact that nobody has done this before and there’s no prior model. Every day is a new day for ICANN, and so far it’s going pretty well.

**LUKER:** The “community” in this case refers not to U.S. higher education but to almost everyone in the world, is that correct?

**ROBERTS:** Yes. Since ICANN’s charter is to serve Internet users everywhere, I’ve flown almost 150,000 miles in the past year trying to make sure that people outside the United States understand that we accept our mission and intend to carry it out. I’ve been to China, to Germany, to South America, and to Africa, and everywhere I go, there’s an enormous appreciation for the work we’re doing and a willingness to help continue that work and to help the Internet grow successfully not only in the educational area but also in business, commerce, government, and other sectors.

**LUKER:** What new issues have been raised by the globalization of the Internet?

**ROBERTS:** As I’ve traveled around the world, I’ve seen a tremendous ferment in education at all levels. The United States is widely admired for having the finest, most accessible system of higher education in the world. I think it is in the interest of the United States to have the skill-sets of all of human society across the planet grow together to overcome both economic divides and ignorance and poverty and sickness and potentials for warfare. As an early goal, certainly within the next decade, there needs to be a much higher level of collaboration with our colleagues on a worldwide basis to target specific educational objectives that will help us—to use the economists’ phrase—“raise all the educational boats together.” We have the tools, and we have the capacity, but we need a little bit more motivation to look be-

yond our day-to-day problems, which can be very pressing on our campuses, to undertake some activities in that arena.

**LUKER:** Often the popular press about the Internet seems to oscillate between extolling its tremendous potential for economic development, education, and participatory citizenship, on the one hand, and panicking over its potential for digital eavesdropping, crime, and even warfare, on the other.

**ROBERTS:** One of the lessons we’ve learned—very vividly in the last five years—is that once a research tool that was created and nurtured and incubated in this hothouse atmosphere of university academic research reaches the general public, its capacity for good is counterbalanced by a capacity for antisocial activity. In the past several years, we’ve seen many destructive facets of Internet behavior. In fact, we may end up having to actively legislate the exact manner in which we use this powerful tool, to make sure that there’s always a bias for contributing to society instead of subtracting from it. This is a considerable challenge, because to the extent that we are coercive regarding the antisocial behavior, we run the risk of falling in with the kind of governmental oppression that has caused so much suffering in the last several hundred years.

**LUKER:** Are you saying that we should focus on the behavior of the individual and not on control of the network?

**ROBERTS:** I think that one of the great advantages of the Internet is its empowerment of the individual, which has substantially reduced the hierarchical influence of social institutions—mostly, but not entirely, for the better.

**LUKER:** That can be expected to have a significant impact on individual governments around the world as well as on the way countries work together.

**ROBERTS:** I think it will. I was just reading a short essay by Robert Wright in the *New York Times* in which he commented on the fact that

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the juxtaposition of economic betterment with political freedom—one tied to the other, with in fact some synergy back and forth between the two—has been reemphasized and the coupling tightened by the network because this relationship is based on information and free access to information and that's one of the things that the Internet is all about: access to very low cost if not free information.

**LUKER:** What's missing from the network today? What do we still need to add or improve in order to really transform higher education?

**ROBERTS:** From time immemorial, if you will, we've had the problem that various pieces of the computing and networking fabric lag each other. Years ago we used to complain that the hardware was ahead of the operating system and that the operating system was ahead of the applications. Today we complain that we have a new browser but that it doesn't quite work with

whatever the latest network adapter is and that it is having trouble with the network server. The solution to this problem is first to ensure that the people from whom we buy hardware and software understand that we really are concerned about this integration, especially when it's missing, which it mostly is, and second to create institutional mechanisms for bridging the gaps, such as user-accessible training and education tools, so that people aren't sitting there losing time with a computing resource that's not capable of doing what they need it to do.

**LUKER:** What about the network and e-commerce? Every time we look at a newspaper, a magazine, the television, or even the side of a bus, we see the word "e-commerce." What will e-commerce mean for higher education?

**ROBERTS:** Universities will primarily benefit from B2B (business-to-business) e-commerce because of their substantial purchasing operations. The payoff will be a greater range of goods and services to meet campus requirements, which will be sold in a more competitive electronic marketplace.

**LUKER:** The network has fundamentally changed the corporate world, leading to total reorganizations both within and between corporations. Do you see the same kind of change coming to higher education?

**ROBERTS:** I think that we will have our own version of that issue. Our particular example of the redefinition of relationships will take the form of a new challenge, if you will, to the traditional role of the teacher and the student. Some of this tends to be overblown, but for the sake of argument we can draw the stereotype in which students have always felt that the faculty were not as much interested in what students learned as in what the faculty were teaching, and the faculty have always felt that students didn't care about learning and weren't paying attention. In the new model, the outcome of the educational process is learning, and to frame the educational environment in those terms, we have to focus on the learner and not

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"THE EMPHASIS NOW IS ON LEADERSHIP THAT TAKES THE POTENTIAL OF INFORMATION TECHNOLOGY AND APPLIES IT DIRECTLY TO THE MISSIONS OF THE INSTITUTION AND DOES SO IN A PLURALISTIC WAY."

on conventional teacher-student classroom-style relationships.

**LUKER:** Are you saying this goes beyond the technology and the classroom environment into how we define and measure education?

**ROBERTS:** Yes. The traditional notion of a university education was that if you spent four years and applied yourself, at the other end you would get a degree and would acquire the informal title of an "educated person." We now have too much complexity in our society and in the workplace to hope to "educate" someone in four years. In other words, in every part of human endeavor, the expansion in knowledge has created such a broad knowledge base and set of complexities associated with the knowledge base that no person going to an arbitrary place for an arbitrary length of time is going to possibly comprehend how to deal with all of that as a worker and as a person. As individuals meet the challenges of life, they need to have ongoing access to resources that enable them to be more successful both in terms of their own self-esteem and in terms of their objective social accomplishment. We net this down to the phrase "lifelong learning," but most institutions have a considerable distance to go to make the phrase a reality in their programs.

In addition, one of the changes that powerful networks are creating is the ability for institutions to be more differentiated than they used to be. We don't know the extent to which that's going to change the character of education. Typically what the network has done in the business world is opened up a whole lot of new business niches. For instance, almost all of the dot-coms occupy business niches that didn't even exist five years ago, and they're growing in those niches. In higher education, are all institutions going to establish interactive learning environments, for example, because the tools will ultimately become sufficiently inexpensive, or is the power for an institution to differentiate itself in a specific educational niche going to lead to specialization based on economic factors, to an educational niche that may or may not also be a business niche? We simply don't know the answer to that, but the high probability is that the

rapid growth of for-profit higher education by organizations that understand this business of new business models, that understand the deployment of innovative technology to create new business niches, is definitely going to have an effect on higher education.

**LUKER:** A major function of the network in that role is allowing an institution to sell or provide access to its niche, however specialized, for a widely dispersed audience and still achieve critical mass.

**ROBERTS:** I think there's absolutely no doubt about that. We have heard a lot of talk about a revitalized approach to what we used to call distance education, which we now tend to hear called interactive learning, but it's certainly distance independent and in many respects it's market independent.

**LUKER:** OK, we've spent years working on building a network that operates and finding affordable computers and interoperable software and training our staff. Now it's all starting to come together, with the advent of applications not just in administration but in the real business of the university, in teaching and learning—digital libraries, collaboration tools for research. How has this changed the profession of IT management?

**ROBERTS:** It certainly demands individuals of considerably broader career. Just to give one example, in the early 1970s one of the very important ways to get promoted in a university computer center was knowing how to make an IBM mainframe actually run. That was a rather specific and fairly narrow but very vital skill-set. People got fired for not being able to make IBM machines run. But today, the director of information technology is expected to be able to sit down with senior academic figures or executives on the university campus and discuss substantively with those individuals what their role in the institution is and how the information technology organization can support their work.

In other words, to start where we are today and work backward a little bit, the emphasis now is on leadership that takes the potential of information technology and applies it directly to the missions

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of the institution and does so in a pluralistic way. Years ago, data processing was simply about automating clerical activity, a very low-level but nevertheless important function of the university. Today we're much more concerned about focusing the potential of information technology on the actual learning and research processes. We have a greatly expanded capacity, capability, and power to integrate man and machine functionality. It's a very challenging environment for leadership, one that places tremendous demands on the individuals involved.

I think if you look back at the thirty-five-year history of what has become information technology management on university campuses, the thing that has set our group of managers apart is that we've always worked in a job environment in which a facility for adapting to change was a requirement of the job. You never had the same technology to deal with from one year to the next, and you were continuously having to update not only your personal vision of what your job responsibilities and priorities were but also that of your whole organization. Linked to that was our capacity, once we had made a decision about what the job was, to put resources on the tasks and to get them done in a timely manner. That's a characteristic, I think, that has been unique to our community of professionals.

**LUKER:** In higher education today, almost everyone cares about information technology. What is the impact of this new development?

**ROBERTS:** Like many things, this development has an up side and a down side. If you think back over the last thirty years in higher education, there was a time when the manager of data processing was expected to hold an individual's hand through an entire computing process, which led, for instance, to the growth of large user-service organizations on campuses in the 1970s and 1980s. The rise of personal computers, of personal computer interfaces and inexpensive desktop computing, has resulted in a tremendous distribution of ordinary functional responsibilities to the end users. No longer are there central data-processing organizations

that do what we did thirty years ago. The other side of this change, of course, is that since everyone now does computing and networking, everyone has problems with the technology. The challenge for IT leaders is to figure out how to create a sufficient continuity and base of common approaches to problems so that we don't have to find a unique solution for every single individual on a campus. There is by no means agreement on this; the situation is to some extent dependent on the campus and on the environment. This is a swamp that people are trying to climb out of.

**LUKER:** As I understand it, there is also an increasing emphasis on business models and on steady-state or long-term funding versus just the technology itself. This begins to make an IT leader look a great deal more like a politician than a technologist.

**ROBERTS:** That's absolutely right. One of the ways this has happened is that the redefinition of information technology as being a directly adjunct function of the pursuit of the institutional mission means that the IT leader must develop new economic models for information technology. Almost all of the old tools we had for measuring the cost-effectiveness of data processing or computing or even the early networks are of very little use to us today because we're still quite uncertain about how this new juxtaposition of very powerful networking and very powerful information technology in learning affects resource consumption and the proportionality with which resources are applied to the learning environment. My impression from conversations that I've had with presidents, provosts, and CIOs is that the problem today is not so much that the leadership of the institution is not willing to spend money and resources on information technology; it is that they have an intense interest in how to decide how much to spend.

**LUKER:** What role can a national or international organization such as EDUCAUSE play for the IT professional?


**ROBERTS:** Among many valuable roles, I would single out the ability to help the chief IT executive position the campus IT organization with the right set of technology resources to meet the needs of the institution.

**LUKER:** What strategy should an IT leader be following today?

**ROBERTS:** There have to be tailored strategies to fit institutional strengths and differences. But nearly every IT executive must concentrate on connecting the information technology developments and requirements on the campus to campus priorities for education and/or research. If IT leaders are not successful in serving the main campus priorities with information technology, if they don't manage to get on the very short list of those most important developments, they will not succeed

in attracting the funds and political support required to move forward.

**LUKER:** Mike, what's next for you personally? I've heard that you ran a marathon last year. Will you run another one?

**ROBERTS:** Well, I'm not sure if I'll be running another 26.2 miles in the future, but I am committed to maintaining an active role in policy development and information technology for higher education. I'm now completely immersed in my role as chief executive of ICANN, but as I step out of that role at the end of its start-up phase I'll be looking for ways to contribute my experience and my expertise to new challenges. As my generation reaches the end of our full-time careers, many of us would like to maintain an active participation and to help at a different level. 

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