

*TWO VOICES FROM THE
FIELD: Interviews by John
Strange, continued*

*In this second interview,
Robert Kennedy, of Apple
Computer, speaks of the
use of technology to
improve learning and of the
growing importance of
Internet.*

Technology and Education: *A View From The Outside*

Robert Kennedy brings to us a wealth of experience in designing and implementing technological solutions for higher education. In this conversation he shares with us his insights into the importance of the Internet, what new technologies higher education should be investigating, what opportunities exist for making use of technologies to improve learning. He stresses the fact that he is still a learner, and technology plays an important role in making him a better learner. He also challenges us to think about how technologies can also be used by educational institutions to meet not only the needs of our enrolled students, but other members of the community such as those living in retirement communities and nursing homes.

Strange: A number of educators have expressed concern about the impact of new technologies on learning. How can this technology be used to stimulate learning?

Kennedy: The students of today are drawn to the new technology and to the new media forms. They have grown up in the MTV era and expect an amount of entertainment in every aspect of their lives. When MTV first started, about 10 years ago, there were very few music videos. Now, every popular record (CD) produced contains one or more selections developed into a music video. The kids of today expect to see as well as hear their favorite artists.

Many educators voice a concern that kids aren't reading as much as they used to and some may not be reading at all. Reading is certainly stimulating, but the attention of today's learner can only be maintained with higher entertainment and involvement. Don't be fooled, educators today are competing for mind share, and technology provides an instrument for winning.

Often, I hear concern that technology advocates want to replace written material and traditional learning mediums. I try to ease this concern by helping educators to see how technology can lead students to reach out and use

information that they might never use otherwise, that they might not even know existed.

Let me give you an example. As a student of the 1970s, I often went to libraries. Typically, I had a subject or an objective in mind and I began my quest for information. Searching through books, magazines, microfilm, and even audio and video tapes, I would find material or references about the specific topic. Occasionally, however, I would come up empty or discouraged by the available material.

I am still a student today, a learner is probably the more accurate term since I am not enrolled in any courses. Technology makes it possible for me to be a very powerful learner today.

Computer and telephony technology provide access to most major libraries through on-line services such as e-World and the Internet. As well, access is provided to other repositories of information, including the Smithsonian Institution, the Library of Congress, and even the Cultural Ministry of France. With access to these sources, I never come up empty and am only discouraged when I run out of time.

Strange: Technology certainly provides greater access to information, but does access to information necessarily lead to learning? What effect can technology have on instruction and thus on learning?

Kennedy: One of the most important ways we learn is to interact with others. This is why we have schools. We learn from each other and we encounter different perspectives.

To this end, the Internet is the ham radio of the 1990s. It brings us into contact with people around the world. We can engage in a conversation, information exchange and often debate. The range of topics under discussion seems almost limitless.

These conversations can be live. Responses are instantaneous and are unlimited in the numbers of people involved. Other conversations (e-mail) allow for coming and going, but the entire record of what everyone said is available there for you to read.

This is exciting. It provides us with contacts we could never make without the technologies. We get perspectives on issues that are not available in the towns where we live or the schools which we attend. We have a world wide community and experts galore with whom we can interact.

Let me give you a personal example. When I was in high school I took a class in which I read *Lord of the Flies*. I remember very clearly how important the conversations and discussions we had were to my understanding of the book. I may have even read the book two or three times. I don't remember. What I do remember is the importance of engaging with my classmates and my teacher about why they acted the way they did. Everybody had a different idea, a different perspective. I learned from that interaction with my classmates.

Technology can play a powerful role in making that interaction happen now. I haven't had any lengthy discussions about literature like that since I graduated from college. Even when I am inclined to have such conversations, I am not in touch with others who want to discuss the same book at the same time that I do. But I can do that now on e-World, the Internet, and other on-line services. Just sign on. It seems like there is someone wanting to discuss everything, no matter what time you sign on.

The point is that all students, and all teachers can now have global conversations, worldwide dialogues. The perspectives that are brought to a subject can be expanded in ways impossible before we had global networks. Schools are already

taking advantage of this, especially in K-12 where there are exchanges that also include pictures, data on weather and ecological issues, recorded conversations. But there is much more that can be done. Dialogues, which I think are essential to real learning, can be held on any topic, book, idea, hypothesis. Now classes can be worldwide, and consequently even better than my exciting high school class in which I read *Lord of the Flies*.

Strange: What other impact can technology have on instruction?

Kennedy: To answer that question, let me share with you another personal story. My sister is a teacher. A little over a month ago I helped her get a new computer and a modem, as well as a connection to on-line services such as America on Line. She also has access to the Internet. Last week her sixth grade daughter had a report to do on Hitler. For the first time, they did not have to go to the public library in order for my niece to do her report. They didn't have to adjust any schedules so that someone could drive her there and either stay or come back later.

My niece started her research with the *Compton's Encyclopedia* on CD that came with the computer. She told me that the CD was fun to use, that she heard some of Hitler's speeches, and saw video clips of him speaking to Nazi troops. Then she got on the Internet. She found a wealth of information there she said, so much that she had trouble limiting her report to the extent that her teacher had requested.

One of the most interesting things to me is that neither my sister nor my niece were trained to use these technological tools. When I took the computer to their house I spent about an hour showing them how to use America on Line. Then the information exploded. And I didn't have to show them anything about the *Compton's Encyclopedia*. My niece could use it right out of the jewel case!

There are three things, it seems to me that we can learn from this story. First, we are no longer limited to the information that is in our library, or even in our house. That, it seems to me, is very important. Access to information is rapidly being equalized. Geographic, regional, cultural barriers to information are falling. Second, we no longer have to adjust our schedules to get information. We don't have to worry about whether we have a car, or can get a ride to the library, or even whether it is open. It is always open! We don't have to travel long distances to do research. Finally, we don't need a lot of training to use these electronic libraries. This is a very important development. We all can now have access to the holdings of the world's greatest libraries from our homes. This also must change our thinking about what local libraries should be like and what they should do.

Strange: Did your niece put any of the pictures, video clips, or sound bytes into her report?

Kennedy: I'm not sure, she certainly could have. The problem would be in presenting it to her class, or in her teacher reading her report. The presentation equipment necessary for students to show multimedia reports is not in place. You can't even be guaranteed that every classroom will have a VCR, much less a computer or a CD player. We can't be sure that the play back equipment will be at school, or in the hands of the teachers even if we can collect it at home like my niece can. We can't even send the information electronically because very few classrooms have telephones and fewer still are connected to e-World, the Internet, or other on-line services.

Strange: Why do you think we need to put these multimedia presentation devices in the classroom?

Kennedy: Students and teachers need to be able to create and publish new kinds of reports and documents that are now possible using the new technologies.

This is already happening in the business world and will continue to expand rapidly. All of our students need to have access to these powerful new learning tools, to make learning better as well as to prepare them for their work.

And as I said earlier, we have to engage the MTV generation. To do this, we have to use multimedia technologies.

My K-12 teachers taught with television, video tapes, film projectors, and some times with record players or tape decks. Back then, you had to have a separate machine to use each of these media types. They were all available, but they were all independent and in limited supply.

Today, they are all combined. The computer can create, access, store and reproduce a wide variety of media. Technology isn't necessarily delivering a wider variety of information, it's just making it all more accessible, through one mechanism, and at a lower cost.

Strange: Well, you brought up the issue of cost first, so I think it's fair to ask you how we deal with the costs of providing access?

Kennedy: As is the case with all new innovations, costs come down with wider distribution and greater competition. Think of the telephone, or even television. When you were a kid, John, a television was very expensive. Only a few people had one and the availability of programming was very limited. But, as more televisions were sold, competition increased and prices declined. The same is true today for the new technologies.

In the early 1980s an Apple IIe cost approximately \$3,000. This expense provided you with 64k of RAM, two floppy drives and a monochrome monitor. This system was widely accepted and purchased by educators.

Today you can get an extremely powerful computer with lots of RAM, a large hard drive and CD drive for multimedia, and a color display for about \$1,700. And the prices are still coming down.

Strange: You're right. The prices really have come down, but multiply this cost against the number of students needing access and I still wonder how schools can fund technology.

Kennedy: There are lots of ways to get funding including: federal, state and local budgets and grants, business to education partnerships, community fund drives and tuition assessments for technology. But in order to attract assistance or get student support, the institution must be aware of the possibilities today and in the future with a well defined plan and be willing to invest its own resources on a continuing basis. Potential partners won't want to be the only ones paying while getting very little or nothing in return.

Another important point to note is the competitive advantages of making technology available and affordable for all faculty and students. Our economic structure is increasingly dependent on information. The individuals and institutions that don't keep pace, that don't invest in the new technologies, will be at a severe competitive disadvantage and will suffer the consequences.

Strange: You have visited a lot of schools and colleges. I am sure their responses to technology have been very different. Can you offer any insights into why those differences exist?

Kennedy: Certainly one of the most important pieces is to have administrators at the very top of the organization who are committed to improving education and in making technology work toward this end. As well, and as I mentioned before, money is important. You don't necessarily have to have a lot of it, but you have to spend all that you possibly can within a well thought out plan.

Third, it's important for any organization, especially colleges and universities, to support those people who are eager to try out new things. A lot of faculty whom I've met think those of us in the computer industry are trying to replace their traditional methods of instruction. What we're trying to do is to support them and their colleagues in showing how technology can improve their instruction.

To this end, faculty have to be rewarded for activities which improve the instruction and learning processes. If faculty who are up for tenure can only count journal articles and books, how can they invent new instructional software, be creators and publishers of multimedia software, have a page on the World Wide Web in their area of specialty? If you want teachers to help invent the future, the new curriculum of the future, reward them for that. Make that part of the tenure process.

This applies to students as well. If you want students to memorize facts, give them tests that ask for those kinds of answers. If you want them to think, to discuss, to analyze and ask questions, test them in this fashion.

Another distinction is geographic. Most of my work has been in the Southeast, especially in Alabama. I hate to say this, but football seems to be more important than academics. A lot of money is available for investment in sports. Precious little goes to improve the academic programs or to improve technology. Schools on the west coast and in New England are different. The pecking order of the best schools is not determined by success on the football field. The universities are either able to do both, or they are clear that academic standing is what counts.

Strange: Before we conclude this conversation, can you provide some insight to any emerging technologies of which we should be aware?

Kennedy: I've mentioned the Internet. It's in its infancy, but it's receiving tremendous backing from business and industry. The Internet is going in all directions at once which bothers some people, but that's really what makes it great.

Let me tell you about my first experience with the Internet and maybe you can understand why I am so excited about it and why I think it is so important.

I logged on to the Internet using Netscape. Netscape is free software that allows you to navigate the Internet using icons and buttons which makes it very easy to use. I logged on. I then selected the Yahoo Server which is an excellent starting point when exploring the World Wide Web. A long list of topics appeared. I selected Art. Another list appeared and I selected Impressionism. All I had to do was point and click. From there I was surfing as they say on the Internet. I was exploring on my own, going where I wanted instantly. But the important thing was that I was choosing content, not location. The Internet took me to the location of the information. I could see at the bottom of the screen where I was, but I was no longer limited to a single place. My first stop was the National Gallery in Washington, D.C. I looked at digitized images of the great works of the impressionists right on my computer screen. I could even have printed them out if I had had a color printer or if I wanted a hard copy in black and white! It took 30-50 seconds for each picture to appear on the screen so it wasn't absolutely instantaneous, but it was a lot faster than flying there. In addition to the collection of the National Gallery, other works by the artist I had selected were listed as being available in other museums. With one click of the button, I instantly went to Moscow State University. I was able to get the images from their collection onto my computer screen as quickly as I was those from the National Gallery. Now I go to Washington often, and I can go to the National Gallery when I am there. But it is not as easy to hop on a plane and go to Moscow! But with one click of a button, I was there!

John, have you been on the Internet? Have you browsed the World Wide Web?

Strange: Well, I have dabbled. But I can't say that I have really used the World Wide Web. I can't access graphical interfaces from home since the University has limited access to text only from off site modems.

Kennedy: You need to use the Internet, John. And you should use it in a graphical mode. Whatever it takes, get access that gives you the graphical interface. You cannot learn about the Internet by listening to me, or by even reading about it. But when you use it, I am certain it will spark all sorts of ideas about how it can improve what you do as a teacher and as a researcher. I don't know what ideas you will have as a result of using the Internet. I would like to know. But those ideas, which are very important for you and for your future students, will not be generated if you don't really try it out for yourself.

Now after you get on the Internet, and see the possibilities of the World Wide Web, you will probably want to read Adam Engst's book, *The Internet Starter Kit*, published by Hayden Books. Engst has written many books on the Internet. Another is for advanced users and still another is for people who want to establish Web servers on the Internet. I can imagine a time when professors will have their own home pages on the Internet. Now some schools, colleges and universities do. Why not individual professors sharing their special skills and knowledge?

Strange: Are there any other things happening with the Internet that we need to know about?

Kennedy: One of the most exciting developments I have heard about has to do with the Internet being taken into retirement communities and into nursing homes. I know the Elderhostel movement has been supported by higher education to provide continuing learning opportunities for the retired population and the elderly. Now opportunities are available to continue to provide educational services to these populations through the Internet. Commercial organizations are beginning to meet these needs. The reports are that the residents of these communities are taking to these networks in droves. They are excited about the opportunities to continue to be involved, to have access to major learning opportunities.

Strange: That sounds exciting. Higher education might consider providing educational services to these populations through the Internet. What other new developments should we in higher education be thinking about?

Kennedy: Certainly the delivery of motion video over networks.

Strange: Do you mean video conferencing, or what we now call distance learning?

Kennedy: Well, it is more than that. It is the ability to transmit motion pictures of what is happening at that moment, or what has been recorded earlier, to any site on the network that is connected at a given time. Today we have distance learning sites in which we deliver video to a few remote sites, usually using satellite or high speed, dedicated telephone lines. But in the not too distant future we will be able to transmit video and audio simultaneously to any site connected to the network. And all of this will be done in real time. But the term video conferencing helps us understand the general concepts of what we are talking about.

Strange: How far away do you think we are from having this technology available?

Kennedy: It all depends on what you mean by available. In not more than ten years video conferencing on the Internet, or whatever the Internet becomes, will be as common as microcomputers linked to an on-line service such as America On-Line is today.

Today about one out of every five or six homes in the U.S. has a computer

and about one out of every ten of those homes is connected to an on-line service. So in ten years we can expect that kind of penetration for networks that can carry video conferencing. But, video phones will replace traditional handsets much more rapidly. Maybe in five years a larger number of telephone customers will also be seeing who is calling.

Strange: I know some of my colleagues may have trouble imagining such a time. What should we be doing about the future of which you speak?

Kennedy: You have probably seen the AT&T ads that say "If you haven't used it yet....you will!" Those ads are correct. It is coming. Maybe not as fast as AT&T, Apple, IBM, or Microsoft would like. But it is coming. The point is that we cannot limit our thinking. Just because it is not available today, we cannot think that we are stuck with what we have today. In fact, I think that colleges and universities need to encourage the development of tools and approaches that make use of technologies that are emerging. This may be even more important than developing for those technologies that already exist. Only then will institutions of higher education be producing the instructional materials, the courses that will be useful tomorrow. Too often they react by saying, Well, that technology is not widespread. No one will use it. New products that make use of new technologies aren't created overnight. If you wait until the technology is fully in place, another new technology is right around the corner that is even more powerful and compelling. You have to set your sights ahead. And you have to know what is coming out of the research labs to market.

Strange: What about CDs? I see them as a major way of distributing multimedia materials, at least in the short term.

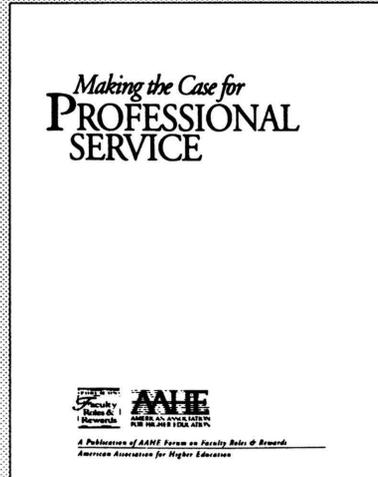
Kennedy: Yes, that's probably right for the short term. Even CDs that are 6X, or six times as fast as the original CD-Rom players, are cost effective now. But CDs will be replaced in ten or fifteen years by networks that can carry all of the interactive multimedia you want at speeds you can now get on your CD. The important point, John, is that you are stimulating your students by engaging them in using multimedia. I spoke earlier of the MTV generation and of the importance in reaching them. They live in a multimedia world. Engage them, continue to stimulate them to create and publish multimedia products. They can deliver those products for a while at least on CDs. Then as the technologies change, they can deliver their products of the more powerful networks we will have by about 2010. The emphasis on using, creating, publishing multimedia products is an important one.

Strange: Bob, as always, you have stimulated my thinking and you have gotten me fired up about using the Internet. I am sure that will happen with the others who become part of this conversation. Maybe next time we will be doing it on the network.

Kennedy: Sounds like a good idea, John. I'll see you surfing on the Web, as they say!

Making the Case *for* Professional Service

By Ernest A. Lynton



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Commonwealth Professor and senior associate of the New England Resource Center for Higher Education at the University of Massachusetts at Boston, Ernest Lynton is the author, with Sandra Elman, of *New Priorities for the University: Meeting Society's Needs for Applied Knowledge and Competent Individuals*. An AAHE senior fellow, he has worked with the AAHE's Forum on Faculty Roles & Rewards since its inception.

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