Quest #110: Information Superhighway

(Christine Young, Program Host) Coming up on Quest: Just what is the Information Superhighway? Many computer scientists have big ideas for the future of digital technology. And, in Maine, information is already taking new forms. Maine schools and public libraries will soon have some of the best connections to the information superhighway. And how much should our schools rely on computers for learning? The latest thinking on how effective computers are in the classroom. That's next on Quest.

Maine Public Television's production of Quest "Investigating the World We Call Maine" is funded through a television demonstration grant from Rural Economic and Community Development, part of the USDA.

(Christine Young, Program Host) Even Maine's most far away places are within reach of the information age. From the islands to the county to the western mountains, we're making plans for this new age of information. The information superhighway, the Internet and the digital revolution are becoming widespread in Maine, yet there is still some concern about who will and who won't have connections to this on-line world.

Dana Hutchins has this preview.

(Dana Hutchins, Segment Host) These ultrathin wafers being manufactured here at National Semiconductor in South Portland are microchips. This Semiconductor technology has evolved quickly in the last few decades, providing brain power to a wide range of products from TVs and VCRs to satellites and space stations.

(Voice) The early 60s brought a whole new revolution in technology. It resulted from a breakthrough into the world of the super-small.

(Dana Hutchins, Segment Host) These recent advances in technology have also been essential to the growth of the information superhighway. Microchips, also known as integrated circuits, are a key component of the types of equipment that are needed to create the superhighway. Computers that can store large volumes of information, and that can talk with one another. There are signs all over Maine now, in every corner of the state, that the superhighway is coming.

(George Markowsky, University of Maine Computer Science) We're living through history, we're living through one of the most amazing times that there ever has been on this planet. It's this whole transformation from analog to digital, and it's not something that's going to happen; it's something that has happened.

(Dana Hutchins, Segment Host) Computer consultant Al Caron is known for his zeal when it comes to talking up the superhighway.

(Alan Caron, Computer Consultant) With advanced telecommunications, it's not going to matter where you live any more. We will have people working in Maine who are working in Tokyo, who are working in New York, San Francisco, but living in Maine and never leaving Maine.

(Dana Hutchins, Segment Host) When the information highway is in full use, these visionaries say information will be much different than we know it today.

(Dana Hutchins, Segment Host)) Get ready, you have movies, television, music, phone calls and written information piped through the same lines and equipment, and it will be moving into and out of our homes and businesses.

(Phone ring)

(Man) Answer call.

(Dana Hutchins, Segment Host) When this highway is all laid out, it should be easy for all of us to navigate. New inventions are coming that will allow us to bypass much of the technical work and instead let us use voice commands or touch screens and keypads to make all this information do what we want it to.

(Alan Caron, Computer Consultant) I think where it's heading is you're going to see a massive conversions of media. You're going to see telephones and cable companies, and TV and radio and newspaper and all of that are going to start interacting in some kind of electronic, I don't know, media of the future that will be a combination of all sorts of things.

(Dana Hutchins, Segment Host) Many users of the superhighway will be just for fun. Television programs and video will truly be available on demand. Even if a program is being broadcast live, you'll have remote control so we can stop, start, and go to any previous part of the program at any time. And, we'll be able to personalize how we want to watch news or even sports on TV. The superhighway will allow us to chose camera angles, replays and even our own commentators.

(Liz Harvey, Resort Sports Network) The user is in control now and that again is the major difference between the Internet and television.

(Dana Hutchins, Segment Host) Liz Harvey is an editor for Resort Sports Network of Portland.

(Liz Harvey, Resort Sports Network) The freedom of spontaneity and being able to buy things when you want to buy them and check out weather information when you want to check it out and not wait for the weather channel is tremendous.

(Dana Hutchins, Segment Host) All of this won't happen overnight. There are many inventions that have to come first. But one of the most important areas of this superhighway is already part of our lives. Information in digital form. It's how we hear music from our CD players, get cash from an automated teller machine, and play games on CD-ROMs. That's digital information.

(Voice) Our world exists in analog, but the global network is digital. Touch a keyboard, speak into a telephone. Even step on the brake pedal in your car. and you deliver an analog signal.

(Computerized Voice) To make information digital, it's converted into what's called binary numbers which are all zeros and ones.

(Dana Hutchins, Segment Host) Each zero and one is a digit or bit, and each letter of the alphabet is eight bits long.

(Alan Caron, Computer Consultant) There is either something which is usually represented by one or there is an absence of something which is usually represented by zero, and between those two things you're able to communicate all sorts of sophisticated and subtle information.

(Dana Hutchins, Segment Host) Once the information has been changed to bits, it can be fed into and stored in computers as long strings of bits. It's like a code. Gerry Dube of the University of Maine Computer Services explains.

(Gerry Dube, University of Maine Computer and Data Processing) What that means is that everything you want to represent, whether it be alphanumeric data, whether it be pictures, whether it be sound, if we can code it somehow in series of zeros and ones, then all of these things take on a common form and can be all transmitted together.

(Dana Hutchins, Segment Host) Before information can go into a computer, it has to be converted into binary numbers. Digital machines change the information back into a more useful form for us, text on our computer screens and musical notes from a CD player. For a computer to store and manipulate this digital information, the switches in the microchip interpret bits as sequences of "on" and "off" millions of times per second.

It looks as though in the future, almost all of our information will be digital and that is what will make up a lot of the traffic moving up and down the information superhighway. Entire libraries are now being scanned and stored as digital data on compute disks and CD ROMs. Newspapers and magazines are now being composed in electronic form. Photographs, films and videos are being converted to digital. All this information is being stored in data bases on computer servers, which are computers with lots of memory disks. Once digital information is stored, it can be called and changed almost instantaneously. With the information superhighway, all of us with access to a computer can use this information as we see fit.

As more and more information is available digitally, we're also coming up with faster ways to handle it. Compressing data is one way. Too many bits of information can overwhelm some computers or take a long time to travel from one computer to another.

(Gerry Dube, University of Maine Computer and Data Processing) The fact that it takes so much information or so many zeros and ones, if you will, to represent pictures, has created such a load or such a demand for band width that anything we can do to take up less information space to represent this graphics, the better off we are, and so that has led to the development of many sophisticated compression techniques, which means taking the total number of zeros and ones and squeezing them down by this algorithm so that now we can transmit a smaller number of zeros and ones but at the other end recreate the picture with its full resolution.

(Dana Hutchins, Segment Host) There are limits to compressing data, and it's expected that in the near future we'll be moving ever-increasing numbers of bits around. That's where the information superhighway comes in and all the talk about fiber optics.

Fiber optics is a very clear glass or plastic cable. Electronic information doesn't move any faster through fiber optic cable than it does through regular wire. It all moves at the speed of light. The difference is how much information a computer network can handle, it's band width.

(Gerry Dube, University of Maine Computer and Data Processing) Band width is a function of the cable that one uses to carry information, and typically fiber optics will carry much greater amounts of information than does, say, typically copper cables, but that's only one of the elements. The other elements are the electronics that go at the end of that cable and improvements are being made all the time, so even with the same piece of fiber optic cable we might find that in a year or two from now we might carry 10 times as much information as we're able to today, but over the same cable.

(Dana Hutchins, Segment Host) Band width is a measure of the number of bits that can be moved through a cable in one second. One of the reasons we don't have an information superhighway yet is because there isn't enough band width in our communications network.

(George Markowsky, University of Maine Computer Science) We are really at what I'd call the Model T stage of

the information revolution. The only thing that is slowing us right now is ... our computers are good and fast, it's like we have good fast cars but our roads are very narrow and are very slow. And all across the country, all across the world, we're rebuilding those roads, we're making them bigger and faster. Maine is in the process of building an advanced network. Within two years we will lead the country in our telecommuni-cations network. When we have that in place, we will be able to send tremendous amounts of information.

(Voice) During the 20th century, companies and institutions have grown from simple, one-location operations to complex regional, national and international organizations.

(Dana Hutchins, Segment Host) Computer networks can be local, connecting people at the same job site, or remote, where users are thousands of miles away from one another. Computer networks have made electronic mail, or e-mail, popular. Servers act as mailboxes for messages going back and forth. By connecting to a server, we can send mail. We retrieve it by downloading the contents of the server to our own mailbox. Group discussions on networks and bulletin boards have been popular for about 10 years now. Topics up for discussion run the gamut from bizarre to the practical.

(Liz Harvey, Resort Sports Network) One of the biggest things I do every day is answer roughly 100 e-mails from our users and we've really built up a community out there of people who are RSN groupies. We're committed to it financially and spiritually and morally. We're all living it, breathing it, sleeping it. But, it's only because we are convinced that the Internet is the way of the future for our marketing strategy.

(Dana Hutchins, Segment Host) The Internet, which we hear so much about now, is often confused with the superhighway, but they aren't quite the same. The Internet is a group of computers that are already connected together. It's the closest thing we have to an information superhighway today. And, it will eventually evolve into the highway.

(George Markowsky, University of Maine Computer Science) If you think of your computer being connected to 500 million other computers in the world, any of which you can go the for information, and if you think of software where you can say 'give me the 500 best computers for this kind of information,' that's really what the Internet is. It's an astounding change in the way people get information.

(Dana Hutchins, Segment Host) The Internet is an outgrowth of a 1960s government project when scientists and engineers wanted a way to communicate with one another. The US Department of Defense footed the bill for these computer networks because it needed an alternative way to communicate with the nation and to safeguard key research projects in the event of a disaster. Most early users of the computer network didn't care about entertainment or even whether it was easy to use. But, others who saw its potential kept pushing its limits. And the Internet as we know it today evolved quickly. In 1989, the US government decided to stop funding the computer networks and the groundwork was laid for the Internet to go commercial.

(George Markowsky, University of Maine Computer Science) It's worth remembering that most of us hadn't even heard of the Internet 10 years ago, even 5 years ago, and there are now literally millions, if not hundreds of millions, of people worldwide who are connected on the Internet. That's growing, continuing to grow, and continuing to accelerate.

(Dana Hutchins, Segment Host) The Internet is a cost-effective way to communicate. Especially, for global companies whose customers and suppliers are often in different time zones. Lynn Jepson, of National Semiconductor.

(Lynn Jepson, National Semiconductor) We utilize the Internet, both internally and externally. Most important to national is that it provides customers with a way to access information easily and quickly. Technology is very important to get a product out there fast. So, we want our customer to have everything that they need in front

of them when they need it.

(Dana Hutchins, Segment Host) In the future, much of the business we do will take place over the Information superhighway.

(Alan Caron, Computer Consultant) The Federal Government has announced that in the future, and it's the very near future we're talking about, all small business, all small orders, $100,000 or less, will be available only electronically. So, if you're a small company and you don't have the facilities for dealing with this, you're going to be cut out of all federal business.

(Dana Hutchins, Segment Host) In recent months, there has been an explosion in the number of Maine businesses to set up Home Pages on the Web. But, this medium is unlike any we've used before, and we are just beginning to learn how best to utilize the Internet.

(Liz Harvey, Resort Sports Network) To have a really high traffic Web site, you need to change that information every day. If the content isn't changed and updated, people get bored and they won't come back. It's very different from normal mediums where you're just selling, hard sell. This is more of an interaction with our customers. We're talking with them.

(Dana Hutchins, Segment Host) Even though the Internet has become a major tool for Maine businesses, it's still a complicated task for the average consumer to get on-line.

(Joe Michaud, The Portland Newspapers) I kind of see this as being the equivalent of the early days of radio, where you had a lot of hobbyists who were spending time in their attics watching or listening to distant stations. And they were willing to really put in the effort to listen and to learn the technology and to see through all the static and hear through all the static and I think that's where we are now.

(Dana Hutchins, Segment Host) Joe Michaud directs the Internet version of The Portland Newspapers which went on-line just six months ago.

(Joe Michaud, The Portland Newspapers) I think the potential is to have a much more informed citizenry. I think people will have the opportunity to get much more deeply into a subject than they've ever done before.

(Dana Hutchins, Segment Host) Most of us get connected to the Internet through our personal computers and modems using phone lines. That's a primitive connection by superhighway standards, since phone lines have a low bandwidth. As new technologies develop, there are many companies vying to provide us with high speed connections.

It is not clear who will be the big winners when it comes to providing Internet service to our homes and offices. Phone companies and cable companies, such as Time-Warner here in South Portland, plan to offer Internet service in the near future. What is clear is that you'll have many more options when it comes to hooking onto the Internet than you do today.

What we typically think of as at Internet is actually a subdivision of it known as the World Wide Web. The Web is popular because it connects servers that offer graphical information, such as color pictures and even sound and video clips.

Another feature of the Web, known as hyperlinks, allows us to connect directly to other Web sites.

(Liz Harvey, Resort Sports Network) Every time you see something underlined on the Internet, it means it's a

hyperlink to another Web site.

The concept of a hyperlink is that now the power is in the hands of the user.

(Dana Hutchins, Segment Host) In order to navigate the Web, we must use what is called as a "browser." Today, Netscape Navigator is the most common.

(Liz Harvey, Resort Sports Network) A browser is a piece of software that allows you to easily get around the Internet. Only real computer geeks, as we call them, will be able to get around the Internet without a browser.

(Dana Hutchins, Segment Host) The biggest problem we face when we first start using the Internet is finding what we want, or remembering where we found it. It's been described as a library without a catalogue.

Search tools like Yahoo and Lycos have become popular. These search engines allow us to find information based on key words and topics. Key word searching can save time, and it also let's us customize the information. And, new software is constantly being developed to help us use the Web. Some of the latest versions allow users to customize the types of information they're interested in, from stock prices and industry news to horoscopes and travel planing. In a sense, a customized newspaper covering topics from around the world.

This is one of the main differences between getting information via computers and some more traditional means, printed magazines and newspapers, even television. We have no way to alter the printed or broadcast version. We either taken them or leave them.

(Joe Michaud, The Portland Newspapers) I think this is the beginning of a new way of interacting with readers. I think five years from now we can start seeing some real transformation in how people use TV and the on-line services. I think there could be some real convergence between video on demand, news on demand, things like that that we have a hard time picturing right now.

(Dana Hutchins, Segment Host) That kind of control may sound enticing, but the total number of users of the Internet and even of the easy-to-use on-line services is still a very small slice of the population. So far in Maine, it's estimated only about 45,000 residents subscribe to an on-line service that gives them access to the Internet. That's less than 10% of the State's households.

(Alan Caron, Computer Consultant) When there were only two telephones, one that Alexander Graham Bell had and one that his assistant had, then the telephone wasn't very useful, and as, you know, the number of people on the telephone system increased, then obviously the telephone became a lot more useful. The same thing with the Internet.

(Dana Hutchins, Segment Host) The Internet won't actually merge into the information superhighway until everyone has the means to get on board.

(Christine Young, Program Host) For a state that sits at one of the far ends of the country, Maine sure has moved center stage when it comes to getting connected to the information superhighway. Maine is positioning itself to take the lead, ahead of every other state in the country, in getting our schools and libraries on-line, connected to each other and sending information to one another. How are we doing this? Kate Arno has more on what we call the cyberstate.

(Jim Moulton, Cyberstate, Brunswick High School) But what I do think a lot about is how we're going to use this network that we're building. And, I firmly believe that the ability to create information to put on the Web can be your ticket to wherever you'd like to go.

(Kate Arno, Segment Host) In a few school districts across the state of Maine, this is a typical day in the life of a math student. Brunswick is one of those districts that's ahead of the computer-in-the-classroom curve.

(Jim Moulton, Cyberspace, Brunswick High School) Our kids are either going to be flipping burgers for the people who are running the network or our kids are going to be running the networks. And I am going to make very sure that the kids I work with are going to be running the network.

(Kate Arno, Segment Host) President Clinton would like all public schools in the country connected by computer. To get there, the President is offering some federal money, but hopes states will make up the difference by working with private groups to set up networks.

Maine has already done that. Because of three major computer networking projects, Maine will soon be in a class by itself, and all of the other states in the country will be playing catch-up to Maine.

Linda Lord, of the state library, marvels at what's unfolding in Maine.

(Linda Lord, Maine State Library) ... but I see an advantage in Mainers being able to say that we're keeping up with the rest of the world; in fact, we're not even keeping up, we're moving ahead of the rest of the world in terms of these services and tools that we can offer our citizens. I think this, mentally and morally, is a wonderful thing for the state of Maine to be able to say that Dirigo is very appropriate here. I lead.

(Kate Arno, Segment Host) Two major infrastructure projects are underway in Maine. Infrastructure in this case meaning the backbone for advanced computer connections. From that backbone, hookups for all of us should be easier and less expensive. One initiative gives high schools, vocational schools and libraries a network for interactive voice, video and data. The other gives every public and private school and library in the state a way to link up to the Internet and to each other. Even to computer consultant, Alan Caron, who has been advocating for a telecom-munications plan for years, what's happening in Maine exceeds expectations.

(Alan Caron, Computer Consultant) It's going to transform the way that a lot of kids learn and those of us who have grown up and gone to more traditional schools and classrooms, it's going to be a little hard for us to understand it. But, we have to prepare our kids to live in and compete in the 21st century, and part of that is being familiar with and using telecommunications.

(Kate Arno, Segment Host) The most ambitious project which will connect all the libraries and schools from 12-1300 sites will be paid for by NYNEX or, more accurately, the customers of NYNEX. In lieu of a refund from the phone company, the first Public Utility Commission asked NYNEX to put the $20 million that it had overcharged customers into a computer network to serve the entire state.

(Linda Lord, Maine State Library) Many Maine citizens count on their libraries as up-to-date sources of information in whatever format people need it, whether it's videotapes, microfiche, film, newspapers, magazines, books. This is libraries' role, or major role, to provide information to Maine citizens. If Maine libraries could not afford to do this electronically, because of on-line telephone charges, then the role of the library would change enormously; in the worst case scenario, with some libraries to become reading rooms rather than sources of information.

(Kate Arno, Segment Host) In recent years, much of the infra-structure for a computer network was being put in place. Phone and cable TV companies have been stringing hundreds of miles of wire and fiber optic cables in anticipation of computer networking. But, an actual link to networks like the Internet is still a toll phone call away for most of us. And, with one of the highest in-state long distance rates in the country, many of us cannot afford to get on line.

(Don Nicoll, Computer Consultant) If you're in a rural area, you may have to pay long distance charges to call the next town and that can add up great deal, particularly if someone gets on the Internet and starts surfing and forgets what time it is and how much time has gone by.

(Kate Arno, Segment Host) The University of Maine also has been laying out an educational computer system across the state. Because of the computing and data processing services, or CAPS, educators, government and some non-profit organizations can connect with one another and tap into the Internet. The University has digitized the catalogues of all its libraries in Ursus.

(Gerry Dube, University of Maine Computer and Data Processing) And that system is attached to this network, and anyone attached to the network can access Ursus via this network, and that includes those K-12 schools or other public libraries that may be so attached.

(Kate Arno, Segment Host) Then there's an interactive television network called ITV, which links more than 100 locations throughout the state and offers college level courses. It uses a combination of high tech, like fiber optic cables, and not so high tech, like telephones.

(Student) I did want to ask you though ...

(Kate Arno, Segment Host) Most ITV students are working people who live in rural areas who have no other way to receive a continuing education.

The small public library on the island of Vinalhaven is getting a jump start on the 21st century. Thanks to one bond issue in 1995 the library, as are others in the state, is now on-line with Ursus and other research data bases. And because its a test site for the NYNEX relay system to link all schools and libraries, it now has two personal computers for both students and the public. And it has the CAPS system on line so people can surf the net and send and receive e-mail.

(Angelyn Olson, Vinalhaven Librarian) She Made a Leaf is by a different author.

(Kate Arno, Segment Host) Angelyn Olson is head librarian.

(Angelyn Olson, Vinalhaven Librarian) We got the bells and the whistles. We jumped in with both feet and had the entire world; it was at our fingertips within a matter of minutes.

(Kate Arno, Segment Host) Some libraries in Maine don't even have phone lines into them, much less computers and Internet access.

The computers at Vinalhaven Library are for both students and the public. There is a sign-up schedule for them, but once signed up many users don't know when to start.

(Angelyn Olson, Vinalhaven Librarian) It was a lot of stuff that we weren't prepared for. It is pretty overwhelming at first. We knew basically what we wanted to be able to do with it, but when the options were presented and in was actually sitting on the table, we knew it was much bigger than what we had even planned for.

(Kate Arno, Segment Host) Every day and a couple of evenings a week there are training sessions offered. Olson's library also can take advantage of another 1995 bond issue passed by Maine voters. This is an even more advanced network using fiber optics that high schools, vocational schools, and libraries could hook up to. This network would be through a large information pipeline, lots of band width in these fibers.

Maine is using North Carolina as its telecom-munication model. That state now has the best on-line schools for distance learning in the country. Its telecommunication network allows students to tap into classes at major research and population centers.

Hello there, welcome to Noahs, Keepers of the Ark.

(Kate Arno, Segment Host) Students also can go on video field trips where they use the network to meet and interact with distant sites of interest. Like the Smithsonian, in Washington, DC.

(Commentator) How are you? Welcome. We're going to be on the air here in about a minute, so you're welcome and look around, take a seat, and we'll get going in a second.

(Kate Arno, Segment Host) Making Maine's new network the best in the nation will help level the playing field for so many of us.

(Linda Lord, Maine State Librarian) It isn't just a chance to access information, it's a chance to produce information and share it with the world. It's a chance for students to produce articles, reports, research results and share it with other students. And it's a chance for individuals to do the same thing. World Wide Web pages are springing up all over the place from very small businesses to individuals who want their World Wide Web page out there for people to access.

(Bill Lowell, Central Aroostook High School) A lot of you are juniors, some of you are seniors. We want to look at getting some information on the Web about college loans. What I want you to do is use Netsearch ...

(Kate Arno, Segment Host) Even as the framework for the information highway is being extended to Maine schools and libraries, some communities are networking on their own. Soon five school districts and two regional medical centers of Aroostook County will be partners in what is being called the "Atlas Five Plus Project." Communicating through Cable TV lines, faculty and staff in the 20 schools are linked together. The Internet is available for students, and the two medical centers can better collaborate in their services. Bill Lowell, at Central Aroostook High School in Mars Hill, is the driving force behind the County's network.

(Bill Lowell, Central Aroostook High School) Initially, the Atlas Five Plus was brought together by an effort of the schools to cooperate and save money as a consortium of administrative, the cooperative of buying projects and stuff like that. The computer network came more as a follow through to that in terms of simply working cooperatively together.

This is router, and that further translates the signal so it is usable. It comes down near this cable to this unit, and this is our network within the school.

(Kate Arno, Segment Host) Lowell has combined federal grant money to get Atlas Five Plus up and running. He hopes to expand it to the public and make commercial accounts available.

(Bill Lowell, Central Aroostook High School) We have up here in Presque Isle, we have Burrell's which is a transcript company. They have local individuals making transcripts of video tapes. Those video tapes, some of them are coming from MTBN program but they are being transcribed by people up in the County. The electronics are going to allow that type of a job to be available in the County so that we can have people working at that sort of thing and still maintain the quality of life that comes from being in a remote area.

(Kate Arno, Segment Host) Waterville is an example of a town linking itself up though its cable TV lines, and in

this case connecting its colleges, schools, and public offices. Michael Angelakis of State Cable TV in Waterville helped raise local funds for this network.

(Michael Angelakis, State Cable TV) I think the benefit is an infrastructure that they can utilize to better communicate among themselves, an infrastructure that gives them access to much, much greater depth of information, an ability to utilize the infrastructure and the access to the Internet for educational purposes at very economical prices, very economical aspects and use very advanced technology to just better themselves overall.

(Kate Arno, Segment Host) But the most extensive information superhighway ramp and the best one in Maine is in Bethel. It all began with Dutch Dresser.

(Dutch Dresser, Gould Academy Associate Headmaster) There was a need for new computers in the school. We have had computers in the school for a long time. It appeared that those computers could be doing more sophisticated tasks than those that we had before, and when I began to investigate those possibilities, these other things began to grow as possibilities for us.

(Kate Arno, Segment Host) The first phase was getting Gould Academy and the two public schools in Bethel connected and on-line. The local cable TV company wired the town and a special line to the University of Maine Campus at Farmington got the town wired to the world of computer networks.

"Click on the activity you want."

(Kate Arno, Segment Host) Bethel's elementary school now has 120 workstations linked to the Internet. The next phase was modems at the Academy for the public to dial up the Internet, and a commercial venture started by Dresser and a partner to get local businesses on-line.

(Dutch Dresser, Gould Academy Associate Headmaster) When people met me on Main Street when Gould Academy was wired if you will and wished they could have access, I wished they could too, so we went after doing that and this is how we solved the problem if you will.

(Kate Arno, Segment Host) For the third stage of the so-called Bethel datification project, Dresser is using a federal grant to set up several electronic kiosks in the town office. These kiosks will give Bethel residents access to the Internet and to the town's home page on the World Wide Web.

(Dutch Dresser, Gould Academy Associate Headmaster) Today, if you went into the town office, and you were interested in looking at parcel of land and wanted to see a tax map someone would get you the map, photocopy the tax map and provide it. That kiosk will provide you that tax map standing in the town office or in San Diego, California, if you happen to want to look at it. It does not matter.

(Kate Arno, Segment Host) To make getting on-line more affordable, other Maine communities are forming Internet cooperatives to share the long distant costs to Internet connections, but it is not just the toll call telephone charges that worry rural areas. The cost of laying the next generation of advanced cables also may be prohibitively high, and many Mainers still cannot afford to buy a personal computer. The average cost is now about $2000. Many think our best hope for getting more of the public on-line is through state-wide networks through schools and libraries.

(Don Nicoll, Computer Consultant) You have to work very hard to make sure that we are not letting the Internet fragment people, getting them so absorbed with the machine that they forget the people around them, but using it to stimulate more of a sense of community, more real communication.

(Christine Young, Program Host) Because Maine will be soon be out front of the pack for the information age for schools and libraries, there will be uncharted waters we will be navigating. It is assumed that computers and network connections will help us to educate our children, but do we know that for a fact. There are some people in Maine who say we don't know. Barbara Noyes Pulling has more.

(Voice) As we move through the cornea, we see that it is composed of multiple layers of fibers. Now inside the aqueous body we are looking through the lens into the vitreous cavity.

(Barbara Noyes Pulling, Segment Host) Bowdoin College biologist Carey Phillips thinks moving around a three-dimensional eye on a computer makes learning fun for young students.

(Voice) The white fibers we see are behind the iris

(Barbara Noyes Pulling, Segment Host) When finished, this will look like his previous production on cell division. It is a CD ROM which is a computer program stored on what looks like a compact disk. Phillips probably knows more about creating visually imaginative CD ROMs than anyone else in Maine.

(Carey Phillips, Bowdoin College Biologist) Whenever I teach embryology we always talk about cells and tissues that are moving around in three-dimensional space, and most people cannot visualize that. It makes it much more difficult for them to understand the more detailed concepts, so to get around that problem I started making three-dimensional animations so that they can actually visualize things that were only described previously as words in a text.

(Voice) So let's fly into a dividing plant cell and watch. We see that the cell wall

(Barbara Noyes Pulling, Segment Host) Phillips' first CD ROM was on cells.

(Voice) Moving through the cell wall of the plasma membrane we see the nucleus straight ahead.

(Barbara Noyes Pulling, Segment Host) He's putting the finishing touches on the human eye version. When it's done, there will be a series of optical illusions students can experience on the computer screen.

(Carey Phillips, Bowdoin College Biologist) The bar appears to be graded from blue on this side to violet on this side, but if we grab hold of it and move it to a black background we can see that it is a single color.

(Barbara Noyes Pulling, Segment Host) This will be the first CD ROM of his to be marketed. If there is as much interest as he thinks there will be in eyes and other three-dimensional learning tools, he will be producing them as fast as he can.

(Carey Phillips, Bowdoin College Biologist) It is a great project, and we have to visualize what the questions are, what the points are that you want to get across, on design, all the art work, and then figure out how to make it interactive and since it is nonlinear, people can come at any particular point from any direction on the CD. We have to make each part self-contained, so it is much different from writing a book whereas you expect people to start on chapter 1 and go to chapter 12. The CD, because of its interactivity, offers special challenges.

(Barbara Noyes Pulling, Segment Host) But can learning really be this much fun? Jean Gulliver is a member of the State Board of Education. She is also a leading advocate of computers in the classroom which she thinks are exactly what most Maine schools need.

(Jean Gulliver, State Board of Education) There is virtually no job left that does not at some point touch comput-

ers and telecommunications. Our students need to be prepared to use those resources, be conversant with them and be able to enter the market place.

(Voice) Double click. There it is!

(Barbara Noyes Pulling, Segment Host) Gulliver thinks education in Maine schools will be greatly enhanced with the coming computer network projects. On-line education on the Internet and other networks is growing explosively. Collaborative efforts are popular such as science projects with students around the country comparing acid rain data or even checking their school lunches for nutritional values.

(Jean Gulliver, State Board of Education) Right now we're very fortunate in Maine in that we have a wonderful, stable community here, but is not necessity reflective of what the rest of the country looks like, and it is important to our students and our teachers to be able to work with that global community and have students access different points of view.

(Barbara Noyes Pulling, Segment Host) But some educators, even those who have played a major role in computerizing classrooms, think we should keep a clear-eyed view of this new technology. That is because we are not sure yet what its impact will be on learning.

(Dutch Dresser, Gould Academy Associate Headmaster) First of all the medium is exceedingly immature. As you know, it is chaotic. It is difficult to travel around in. All the new search engines are helping some, but the medium is immature. The things we're doing on the medium are new and probably a year from now we'll be smiling at some of the things we are doing today. So, I'm not sure people have figured out the best ways to use the medium for any kind of purpose, let alone educational purposes.

(Teacher) Pick an island, see what happens.

(Barbara Noyes Pulling, Segment Host) We have witnessed some changes already with just limited use of computers in the classroom. Teachers no longer choose all the information used in the classroom. Some now comes from cyberspace. There is a new world of information out there for kids, and much of it is in a form they enjoy digesting.

(Dutch Dresser, Gould Academy Associate Headmaster) So it suggests to me that society at large is undergoing some form of transformation. Whether or not I like it is sort of immaterial, it seems to me it is happening.

(Barbara Noyes Pulling, Segment Host) Dresser believes the key is in continuing to teach students to be critical thinkers which is especially important with the information superhighway, because there is little or no quality control over information being disseminated on line.

(Dutch Dresser) If this medium with its questionable information its range of information from questionable to enormously useful and important forces us, as an institution to help people address the quality of argument. It's done everything we could hope for.

(Barbara Noyes Pulling, Segment Host) A recent national survey of educators found teachers consider computer skills more important to teach than learning about classic literature such as Shakespeare or Austin. In the same poll the general public agrees with the educators. More than 3/4 of those polled rank computer skills and media technology as absolute essentials of education. Only _ felt classic literature was absolutely essential.

(Jean Gulliver, State Board of Education) I am not sure I would make that blanket statement, but what I think teachers are saying is that they recognize how critical it is for their students to have a facility with communica-

tions and with computers as a basic part of their learning, that it's just as important that they be able to do that as pick up a pencil and write a statement or do simple arithmetic.

(Arthur Fink, Computer Consultant) My guess is that most of the people who have that opinion don't know very much about computer technology. If they did, they'd understand how limiting it is in a way and how uninteresting it is in some ways.

(Barbara Noyes Pulling, Segment Host) Arthur Fink is not enamored with computer technology, particularly when it comes to his eight-year-old daughter. Ironically he has been a computer consultant since the 1970's.

Music

(Barbara Noyes Pulling, Segment Host) Fink is president of the alternative Waldorf educational movement school in Freeport. He is sorry the schools are now intent on spending everything they have to get computers, and they are not putting as much effort into obtaining art supplies or going on field trips to museums.

(Arthur Fink, Computer Consultant) I think the use of a word processor to write in high school is going to be important. There are some other things of computers that can be important. I do not want to minimize that. The day of the computer is not apathetical to getting a good education, such as being in the drama group or the choral group or playing in a sporting team, being in a debating group, going out into nature, all those are important too.

(Barbara Noyes Pulling, Segment Host) Fink thinks computers are a diversion for adults and even more so for young children. To him, they restrict the universe of children because they use few of our senses.

(Arthur Fink, Computer Consultant) Being a child is having strong feelings and going from highs to lows, and some of those feelings are angry feelings, and being able to run and throw and play is real important, and computers by their nature are just the opposite of that. They keep you still and emotionless and impassive and instead of creating the world, you are viewing the world. You know, you have the idea that you are playing Doom or something and that you are in control, but it's controlling you.

Music

(Barbara Noyes Pulling, Segment Host) But computer networks are expanding the horizons of some Mainers. Those with disabilities who have their own computers now have their own network. Some 1800 Mainers now tap into the Maine Meeting Place that started in Sanford four years ago. Those with disabilities and their family members have a toll-free bulletin board for communicating with one another. They have E-mail and they can get updates on insurance and government programs.

(Ken O'Donnell, Maine Meeting Place) These people are doing things that they never thought they would do before, and this is where we are all connected and people who try this information on MMP and they make a telephone call and they make that commitment to the world and do something get them out of their house. It gets them into the community which we would like to see them. We want to see them in the community and be a part of an inclusive community.

(Barbara Noyes Pulling, Segment Host) We have all heard or chatting on line. There is now experimental software from Microsoft that is call virtual chat. This program adds another dimension to on-line conversations by creating facial expressions for the words we type.

But there are some dangers in the on-line world, especially for children. Some electronic discussion groups are

totally inappropriate for kids, and they can easily, even by accident, enter these rowdy cyberspace neighborhoods.

Programs like Kids Only On-line on American On-line are out there. Some have adult chaperones connected to keep watch. A service like American On-line, the largest now, has several million subscribers.

(Arthur Fink, Computer Consultant) Well, you know, the question is should our children be on-line? Do then need to be on these networks and chatting with each other on the computer. I don't think it is very important that they are. I certainly would not leave them unrestrained on the computer networks any more than I would send our 8_-year-old girl out to wander around the neighborhood and see what she finds.

(Barbara Noyes Pulling, Segment Host) But it's not just junk, pornography or outrageous phone bills that lurk as dangers to children. Another growing concern is computer addiction. Scientists are finding that many children can develop a near obsession with games and chatting on line. Most often they develop a mastery and become less fascinated with computers.

Music

(Barbara Noyes Pulling, Segment Host) But sometimes they find computers an addictive means of escaping reality. And the options can be quite violent. Take for instance a popular game called Doom. Kids proceed through the game by killing off one's opponents, which might be people or monsters. But the sounds can be quite graphic. Critics complain these games are an example of gratuitous violence. These kinds of games are proving to be very seductive to children, particularly boys.

(Arthur Fink, Computer Consultant) The fact that so many adults are so fascinated with this technology that they're going to advocate for children that are not afraid of it makes the danger worse. You know, I hear people saying "well, you know, I'm a teacher, and I don't really understand these computers, but Johnny-it's always Johnny, not Mary-is just a whiz and so I'm letting him teach the rest of the class."

(Barbara Noyes Pulling, Segment Host) But many of us have hobbies that we throw ourselves into like organizing a softball league or acting in a local theater group.

So, why are computers addictive and those other activities not?

(Carey Phillips, Bowdoin College Biologist) I don't think there's an answer to that. I think that most anything that we as humans do there's a good side and a bad side to it. It really depends on how it's used. It's really important to us to create things that are of educational value and we feel good about doing that and we hope that it's good for the people who use it.

(Barbara Noyes Pulling, Segment Host) We can expect to hear similar arguments about virtual reality when it becomes more widespread. Virtual reality can be best described as simulated reality created by computer-generated images which, to the user, can seem quite real.

(Carey Phillips, Bowdoin College Biologist) Virtual reality, as I understand it now, is basically a model of a three-dimensional world. And you have complete freedom to move through it, and you should be able to hear sounds that are connected to various spaces in this virtual setting and by wearing gloves you can reach out and touch things and pick up things, not really touch them but point to things or virtually grab them and I think there's a lot to be said for that. Because it's more engrossing. It's the freedom and the interactivity and the movement and the freedom to go where you want that's a real draw for people. And, again it's a reality world. It's like going to Fantasyland or Disneyland and it's an escape.

(Barbara Noyes Pulling, Segment Host) Phillips is now trying to find funding so he can create a virtual reality trip through a cell. And, he may spice that up by showing how the cell responds to an attack by a virus.

(Carey Phillips, Bowdoin College Biologist) For me, being a biologist and teacher, I think it's a great way to let students into the world that I have access to after 20 years of studying and since I do have the ability to visualize and to me the world of biology and science and inside the cell is just an incredibly beautiful place, and I would love to give this to my students.

(Christine Young, Program Host) As we've seen information is changing all around us. Whether we're ready or not, it would be hard to hide from it, even on an island. Maine is doing more than any other state in the country to get our youth ready for this new age of technology. Yet as science surges ahead with more ways to make the information age happen, it will continue to be a learning experience for all of us on how it best fits into our lives.

I hope you've enjoyed this first season of Quest.
Until next time, I'm Christine Young.

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