The Digital Continuum: A Community Perspective

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I have called this talk "The Digital Continuum" because I don't like the word "divide" very much. The problem with divides is that you always end up with some people on one side and some people on the other. When you divide things up, someone always feels left out.

Continuum is a better word because there is not just one side or the other--connected or not connected. Some people that are not on the Internet today will eventually get connected and do something life changing, without any help at all. Others who already have had a computer and Internet access for some time will never do anything useful or productive with the technology. The digital continuum is not about who has stuff and who doesn't. The real issue is whether or not we know what to do with the stuff.

People always ask, "What is like to live in Blacksburg, where 87% of the residents have Internet access?" The interesting thing is that very little has changed. We still leave our homes to work, to play, and to participate in the life of the community. No one has grown antennas. But the way we think about communicating has changed.

America is an impatient country, and unfortunately, we seem to becoming less and less patient as time goes on. We love what I call the atomic bomb approach to problem solving. When we identify a problem, we want to fly over it at 50,000 feet, drop a bomb, and fly home in time to eat dinner. Flying over America in B-2 bombers dropping notebook computers on our schools and neighborhoods is not going to solve any problems. I'm sorry, but I've been deeply involved with computers and technology for twenty-nine years, and I have never seen a computer solve a problem yet. Computers do not solve problems. People solve problems. Computers can help people solve those problems, but in the end, if I want my kids to get a good education, I'll bet on one well paid schoolteacher over one overpriced computer any day.

I am not here today to talk about technology. As B. Keith Fulton wrote recently, "it's not about

technology.[1]" I agree. In Blacksburg, we recognized very early in the development of the Electronic Village that our job was about education, not technology. Things actually started off rather slowly, back in 1993. I spent a lot of time doing what I call the hand-waving exercise. I'd stand up in front of an audience, doing a demonstration of the Internet, waving my hands and saying, "Trust me, I'm from a major research university and I'm here to help you. Buy a computer and life will get better."

That approach was a complete failure. People were often amused by my excellent hand waving, and sometimes even mildly interested, but technology for technology's sake was not a very compelling reason to change your life. It was not then, and I don't believe it is today. Once we began to focus on teaching people how to use the tools to support their own needs and interests, we began to see positive results.

We recently conducted the second of two surveys[2] we have done of a group of parents who subscribe to a mailing list run by one of our local school board supervisors. We have been trying to find out what happens when you diffuse technology widely in the community. This school board member sends out a thoughtful and lengthy note about schools issues every six weeks or so. The first time we did this survey, we found the results quite interesting, but were cautious about the findings because it was not a truly random survey. Parents were asked to fill out and return the survey, and those that do may tend to be more interested in technology or more interested in community issues.

But now that we have conducted the survey twice, we can look at the results between the two sets of data and have more confidence. What we found was that:

- In 1996 79% of parents found the mailing list helpful in clarifying issues. In 1999, 88% found it helpful.

- In 1996 82% felt more involved in school issues because of the list. In 1999 91% felt more involved.

- In 1996, about 13% were more likely to attend a public meeting because of the list. In 1999, almost 21% were more likely to get out of the house and attend public meetings on school issues.

- In 1996, 53% of parents were more likely to write to a school official because of this list. In 1999, all of those parents were still writing to school officials.

- In 1996, only about 4% of parents said they had spoken at a public meeting because of information received on this list, but in 1999, 27% had not only gone to a public meeting on school issues but had also spoken at that meeting.

In 1996, when we conducted the first survey, 369 parents were on the list. In 1999, 860 parents were on the list. A simple mailing list is getting people involved in community affairs. I want to emphasize that this is twenty year old technology. Someone with an IBM XT could be participating this forum. Being involved in the online life of the community does not require next generation processors, Open GL graphics cards, multimedia sound, or any stuff we are always being urged to buy, lest we feel technologically inadequate.

Anecdotally, in Blacksburg and in other communities with community networks, we keep hearing the same story over and over again: When community and civic groups go online, attendance at their meetings goes up.

Despite the second study just announced that still claims that the Internet makes you lonely, I still don't believe it. I think we need more studies in communities like Blacksburg where nearly everyone is online, so that we can study how regular people use the medium. I don't think the Internet gives you a bad complexion and poor eyesight. You are not inclined to spend all your time in your basement in the dark hanging out in chat rooms, no matter what Ann Landers says. What we see in Blacksburg is that people online tend to get more involved in community affairs, tend to get out of the house more, and tend to feel closer to other people in the community. Note that I said they tend to feel closer to other people, not other computers.

We have a very active BEV Seniors group in Blacksburg, and what I find fascinating is that most of these people did not know each other before they got online, even though many of them had lived in the community for thirty or forty years. Today, BEV Seniors use the Internet to organize a busy social calendar that makes me exhausted just to read it--BEV Seniors are out and about, organizing tennis matches, scheduling charitable work, registering for exercise classes and canasta, and even more astounding, and teaching young people in the community how to use the Internet.

More than three quarters of Blacksburg's forty churches are online as well. When I ask the ministers and parish elders why their churches have Web sites and email addresses, they have a very simple and

very direct answer. They want to keep young people coming to church, and the young take communication via the Web and by email for granted.

In Blacksburg, people are using to technology to reach out to other people, to meet, to play, to pray, to help solve community problems. In Blacksburg, we are all working together, neighbor helping neighbor, friends helping friends, and we are all part of one digital continuum.

If there is a disparity, I do not believe it is digital. My good friend Ray Connor[3], a member of Parliament in Queensland, Australia, believes the real issue is about knowledge. Ray believes that we should be preparing for the knowledge democracy. Owning a computer and having Internet access in the home does not automatically enable a person to find a better job, become more involved in the community, take a more active role in civic affairs, or to better participate in the practice of democracy. Connor notes that as the cost of computers continues to fall and more homes have computers, the real issues will begin to emerge:

- Knowledge Have/ Have nots
- Skill Have/ Have nots

In Connor's vision of the knowledge democracy, communities that are serious about solving the digital divide will focus less on acquiring "stuff" (i.e. buying computers) and focus more on comprehensive training programs at all levels, including K12 schools, higher education, and adult education. In the knowledge democracy, one's level of participation will based heavily on one's ability to acquire information, turn that information into knowledge, and use that knowledge to improve one's own socioeconomic situation or that of someone else in the community.

It is important to remember that humans create and use knowledge; the computers and the networks are just convenient tools. Digital information systems store and manipulate data and information, but these systems cannot create knowledge--that is a uniquely human ability.

Community networks can play a key role in solving the knowledge divide problem by identifying new skills needed, developing training and learning programs, and delivering training to the community.

At a higher level, community networks can also play a key role in educating our political leaders, our business people, and our traditional educators (e.g. K12 teachers) about how to adapt and extend existing community systems in this time of change. Connor proposes a series of issues that communities

must be prepared to discuss openly:

- The changing rights to information – who owns information and who can distribute it?

- The right to communicate as a basic principle of citizenship.

- Privacy issues, especially as they relate to personal information and the needs of the community for open communication.

- The issue of who should own telecommunications infrastructure, and how communities can ensure a sustainable future by prudent investment.

- This confusion over knowledge vs. information and the ability of citizens to transform information to knowledge.

We need to remember that computers are a means to an end. I do not believe the end goal should be...."have a lot of stuff." In Henry County, Virginia, Dr. Henry Martin and the County Board of Supervisors have the right idea. They decided that the end goal was to ensure that the children of Henry County could find jobs when they graduated from high school. Goals like this lead naturally to thoughtful spending. In Henry County today, every child in 5th and 9th grade gets a laptop computer for the school year for no more than $10/month, and some children only have to pay $1 per month. The children cannot take the computers home at the beginning of the school year until the parents have come in for training. Henry County has a plan.

When we decide to buy stuff for people without knowing clearly what people might do with the stuff, it denies the marketplace the opportunity to respond. And I am not talking here about the Silicon Valley marketplace, which has an obvious conflict of interest when it urges the federal government to buy computers for school children. I'm talking about the marketplace of human capital.

If we believe that communities should be involved in raising our children, why not let communities take the responsibility for figuring out how to get our kids the tools they need as well? Buying stuff without planning how it is going to be used is a waste of money. This worry over computers in the schools is, in part, just that--worry. Stuff is just part of the equation. There are four things that must happen in schools if our children are going to acquire useful technology skills.

- First, you do have to buy some stuff. Computers, network cabling, network equipment, and software.

- But once you have bought the stuff and dropped it in the classroom, we have a responsibility to train teachers how to use it. We are rarely doing this well, if at all. Today we fly over schools, drop computers in the classroom, and expect our teachers to become hardware troubleshooters, software installers, and operating system experts. In addition to all their regular duties. And at low pay.

- We need to supply proper technical support to teachers so they can teach. Remember, we are calling them teachers, not computer system administrators. If we give them stuff, we need to do so in a way that helps them do their job. Too often, schools buy computers without putting the proper support structure in place.

- Finally, we have to supply teachers with classroom ready content. There is much evidence that if we give teachers good online materials--lesson guides, reading lists, work plans, and supplementary materials--they will use those materials and use them effectively. But what we do most of the time, to use a paper analogy, is to hand them a ream of blank paper and a pencil and tell them to write a book. While they are doing their system administrator chores and their teaching chores.

Schools will complain they don't have the money to do all these things, but while all those computers are sitting unused in classrooms, the same school is spending a fortune on copy paper, copiers, copier maintenance contracts, and a staff of people and trucks to haul copy paper from school to school.

If schools get wired, paper should get fired.   If we are going to give people this great new communications medium, let's require a modest 15% a year reduction in paper use in schools, with the savings reallocated to proper technical support for teachers. Incidentally, wouldn't it be a good thing to stop cutting down all our forests for interoffice memos? Which, incidentally, we printed on our new computers.

I said that we need to let the marketplace of human capital work.   Down in North Carolina, Dave Boliek of ExplorNet saw a need in the community for affordable computers, and realized it did not

make good sense to ship all the community's money to northern California.

Instead, Boliek realized that the real goals were, one, help kids get good jobs, and two, provide adults and families in the community with the tools they needed to participate in the Information Economy. So he redesigned a high school shop class to become a computer repair and networking class. Boliek noticed that in the Information Economy, there is little demand for workers who know how to build birdhouses and towel racks.

By making a few calls around town, he found many businesses happy to donate older but still perfectly good computers to his effort. The school system provided a small budget for parts and equipment. And now, in the classes set up by ExplorNet, students learn to repair computers, install software, hook those computers to networks, and troubleshoot problems. And once they have refurbished those computers, they sell them to people on a needs basis for $25. Those small fees help fund the long term support of the program. Not only that, every computer that is refurbished and put back into use is one less computer saved from our overcrowded landfills.

Now, we could ask a school system to send a million dollars a year to northern California to buy computers for our children. The kids in that community could continue to make bird houses in shop class. If we had fifty million dollars, we could help about fifty school districts. But if we adopt the ExplorNet model, we get the whole community involved in the effort, we have a sustainable model that does not rely on the vagaries of grants, and our kids get employable skills.

In Orange, Virginia, Hornet Technologies, another nonprofit project, has high school students building brand new computers from scratch. Once built, they sell them to the school district for use in the classroom. As they expand, they are beginning to sell computers to the county government and local libraries. All of sudden, this tiny rural area has a computer manufacturer in its midst. This is what I mean by letting the marketplace of human capital work.

We have this national obsession with stuff. We need more stuff. We are bombarded with ads to buy more stuff. We worry that we don't have enough stuff. But not long after we buy our stuff, we often throw it out. And then complain that we don't have enough landfills for all the stuff.

Community networks unleash human capital. By focusing on education, not technology, community networks offer people new futures. This is not something that buying stuff will ever be able to do.

What is a network?

In Blacksburg, when I ask people what they think about being "connected," the most common refrain is "I love my email, and I hate my computer." This tells me that what is most important to people is the ability to communicate with others, and that they don't really care about the stuff. It is amazing to me that the technology industry--what we are calling the engine of the American economy--does not think that there is anything wrong with selling their customers stuff that is hated. Can we imagine saying that about any other consumer product? "I hate my toaster." "I hate my refrigerator." "I hate my car."

A key problem is understanding exactly what a network is. Networks are not just "stuff". But because it is easy to sell stuff and hard to listen, companies are busy promoting stuff without taking the time to tell us why we need the stuff. There are four parts to a network:

- **People** are the key component of any network. If people are not actively using a network to accomplish tasks (civic, business, personal), there is little point in having a network. Networks connect people to one another, and that is the only reason to have a network. Community networks are 90% community--that is to say, people-- and 10% networks--the stuff.

- The second part of a network is **content**, which consists of data and information created by the people using the network and accessed by other people on the network. Content takes all shapes and forms. Information sent by an email is an example of one of the most common kinds of content; the information found in a Web page is another example.

- Third**, services** enable the flow of content. An email server and a Web server are examples of information services. Servers require both hardware and software to work.

- Finally**, infrastructure** is the cables and network electronics required by services to transfer content among people. The cable and electronics is what most people think of when one mentions the word "network."

All four components are necessary to have a useful network, but note that infrastructure, the "stuff" of networks, is one part of a larger system that starts and ends with people communicating with other people.

The roles of community networks
I believe that community networks have important, long term roles to play in the community.

There are six key roles played by community networks.

- Create and maintain public spaces in cyberspace. There is a reason why the Boy Scouts hold meetings in local schools or the local library instead of the local pizza parlor. We need commercial-free space in cyberspace just as we need public, commercial-free space in our physical communities.   In fact, communities have a long tradition of funding parks, libraries, rec centers, and other public spaces. Community networks provide the same kinds of public spaces in cyberspace.

- Provide training and skills development needed in the Knowledge Democracy. Local leaders, school teachers, librarians, businesspeople, young people, and ordinary citizens all need help. Community networks can play a key role in offering short courses and seminars, and also acting as a clearinghouse for other institutions offering technology training.

- Support community economic development initiatives focused on the Information Economy. Communities need to adopt a more diversified economic development strategy that recognizes 90% of the job creation in this country comes from small business. Unfortunately traditional ED initiatives are often just chasing the elusive car manufacturing plant. The jobs of the future look nothing like the jobs or businesses we have today. In Blacksburg, we have a successful Web designer who three years ago was making $6/hour reading water meters part time. Today this single mother makes $25/hour designing Web sites. That kind of microbusiness is the economic development of the future. And community networks will play a critical role in transforming work and business.

- Develop a community-owned telecommunications infrastructure to support the Information Economy. Inner city and rural areas of the country are not getting the high bandwidth infrastructure they need to compete in the Information Economy. Communities must begin to invest in a community owned telecommunications infrastructure, and there are three key components:

    Dark fiber or wireless transport systems leased out on a first come, first serve basis to

any business in the community.

A community-owned collocation facilities where local ISPs and information businesses can rent space to put servers and network equipment.

A local network interexchange point designed to support very high bandwidth network services. We call this an MSAP, or Multimedia Services Access Point. We have had one operating in Blacksburg since early 1999, and for one ISP, it reduced traffic load on their regional backbone by 90%.

- Community-based information technology consulting and information resource. Community networks can play an important role by providing local government, schools, and non-profits with high quality technical support, system administration, and information services like email. It makes no sense at all to have a half dozen organizations in the community all trying to run a mail server.

- Design, develop, and support widespread use of publishing in the community, at the personal, organizational, and community level. Publishing includes Internet-based broadcasting and distribution of printed text, voice, video, radio, and other multimedia contexts.

Investing in community

We talk constantly about "investing" in a community, but how often do we offer citizens the opportunity to actually do that? Often, investment means getting someone or some organization outside the community to "invest", in the belief that we cannot prosper without external help. Why not rethink the notion of "community investment" to include meaningful investment by residents and citizens?.

If we are serious about investing in our communities, I think communities need to realize that the one of the best strategies may be to simply do it yourselves. Fortunately, the roads of the 21st century are built of fiber. An interstate highway typically costs about a million dollars a mile. A mile of fiber, of the kind that might be used to wire up a downtown area, can cost as little as $15,000/mile for materials if installed by the community itself.

If communities need funds to get started, they can form a nonprofit telecommunications business and sell shares to the community, for $1/share--this will ensure that every man, woman, and child in the community can invest in and take ownership in this endeavor. When someone buys a share of stock,

print out a stock certificate and and give it them. Today, all we read about and talk about are Internet stocks. But buying an Internet stock usually just ends up making someone else rich.   If we are going to buy stock, let's buy stock in where we live, creating public/private partnerships that create locally owned and operated telecommunications systems and jobs--and keep our stock investments and telecommunications fees at home.

There is ample precedent for this kind of enterprise in the community-owned electric and telephone coops that were started in the early twentieth century because the large electric and telephone companies would not provide services to rural areas. Every community, no matter how small, has the human and financial capital to start now. Abingdon, Virginia, a small town of 7000 in southwest Virginia, followed this model, and today in Abingdon, you can get a fiber connection to your home for $32/month. And this not fiber to the neighborhood or fiber to the curb--the fiber comes right into your home or business. The county government cut their telecommunications costs in half by moving county offices onto the fiber backbone. You can stand in the middle of Main Street in Abingdon, and as you look down the street, nearly every single business is connected by fiber to the Internet. In the twentieth century, communities that were not located near public highways had great difficulty participating in the economy. In the twenty-first century, communities that do not build public information highways will have great difficulty participating in the Information Economy.

Communities should be thinking about creating Internet Enterprise Zones (IEZ) as part of a comprehensive plan to revitalize downtown areas and to create high tech jobs in the community. An Internet Enterprise Zone would have:

- Cheap, ubiquitous dark fiber available for lease to businesses and telecommunications companies.
- Colocation facilities for telecommunications service companies.
- An MSAP in the collocation facility with high bandwidth connections to regional and national networks.
- Tax credits for businesses that locate in the IEZ.
- A variety of training and management programs to help startup and microbusinesses enterprises grow quickly and efficiently.
- A community network to spur the broad use of technology by citizens, business, and government.

But as communities do this, it is important to have the end goal in mind. And once again, the end goal is not to buy a lot of stuff and hope something good happens. Defining community, defining what it is we think we are trying to save, is critically important. If we do not take the time to define our communities, do not take the time develop a consensus decision-making process that gives everyone an opportunity to speak up, if we do not nurture the next generation of leaders, and if we do not take the time to make thoughtful decisions, the technology will be all for nought.

I categorically reject the notion that the purpose of the Information Age is to get us all to buy more stuff. The Information Age should really be called the Communication Age. For the first time in human history, we, as individuals, as people with valuable thoughts and ideas--human capital--can communicate directly with whomever we choose, without any intermediaries.   My job, running a community network, is to teach people how to tell their own stories. Simply and directly.

We all have stories to tell.   But today, communities and citizens are being challenged by a new breed of transnational corporations that want to strip away both our privacy and our right to publish our stories online. Instead, they want us to buy more stuff. We need to stop worrying about what stuff to buy, and think more about teaching ourselves and our children how to use the stuff we already have.

I believe that as individuals, our wealth and our abundance is rooted in our ability to tell our stories. Small business entrepreneurs have a story to tell. Neighborhoods trying to regain a sense of community have a story to tell. Senior citizens and second graders have a story to tell. Local government has a story to tell. Community networks help everyone in the community--regardless of who or what they are--tell their story without needing permission from someone else. If we believe in the vision of the knowledge democracy, we must know how to tell our stories.

References

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[2] Kavanaugh, A. and Klagge, J. (2000) *User's Perspective on School Board Mailing List* . Unpublished manuscript.

[3] Connor, Ray (1999) *Notes on the knowledge democracy* . Private communication.

For more information, visit the following Web sites

The Knowledge Democracy Center
The KDC has a special focus on communities, technology, and local governance issues.
<http://www.knowledgedemocracy.org/>

Communities of the Future
COTF is a nationwide organization focused on helping communities create transformational change, with a special focus on consensus decision making.
<http://www.bev.net/cotf/>

Association For Community Networks
The AFCN provides peer support, technical advice, and other services to member communities starting or managing networks.
<http://www.afcn.net>

ExplorNet
ExplorNet is dedicated to improving technology-based learning in schools
http://www.explornet.org/

Hornet Technologies
Hornet Technologies is a nonprofit manufacturer of new computers using high schools students to assemble, test, and package the systems.
http://www.hornetech.com/

About the author

Dr. Andrew Michael Cohill is an information architect with an educational background in architecture, ergonomics, and computer science. He is the Executive Director of the Knowledge Democracy Center (www.knowledgedemocracy.org), an organization charting the intersection of community governance, technology, and economic development. He served as Director of the world famous Blacksburg Electronic Village from 1993 to 2002. He is a widely published writer, and author and coeditor of the popular book about the Blacksburg Electronic Village (*Community Networks: Lessons learned from Blacksburg, Virginia*), now in its second edition. He served as co-chair of the Governor's Task Force on eCommunities for the Commonwealth of Virginia in 2000-2001. He recently advised Hewlett-Packard on their $15 million dollar Digital Village initiative.

Cohill has an international reputation for his efforts in connecting technology and rural communities. He is a member of the National Advisory Board for Communities of the Future, a national coalition of thinkers and policy makers concerned with the sustainability and health of communities. He is completing his second term as President of the Association For Community Networks He is a founding member of the International Community Learning Centers group, and is currently working on a new book on communities and technology that will be published in the fall of 2002. He is works as a consultant to communities and is in wide demand as a speaker on technology issues because of his shrewd insights on the affects of technology on communities.

As head of the BEV effort, Cohill led Blacksburg to become widely known as the "most wired community in the world." In the fall of 1999, more than 87% of the town's residents were using the Internet, and over 75% of the town's businesses had made the Internet a regular part of their marketing. Virtually all residents one or more broadband options at home, at work, or at both. Cohill has served as Director of the project since July of 1993; he has been responsible for the design and development of electronic village services, supervises a research and development group, and oversees an operations group that manages the BEV office and administrative services.

The BEV project has been as a model for "smart communities" being developed across the country and around the world; dozens of other communities have modeled their technology efforts after Cohill's pioneering work.

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