Telecommunications' Big Idea

John S. Niles

Over the past six years, *NTQ* articles have chronicled many aspects of the telecommunications technology underlying a social revolution. Even while many readers of *NTQ* are focused on advancing the revolution through the development and deployment of specific new technologies, some of us are pondering the larger meaning of telecommunications for societal functioning: how people produce, consume, play, interact, learn, locate, and move around. The fallout from marrying computers and telecommunications is described variously by optimists and pessimists: Information overload. More opportunity. Faster pace of life. More choices. More security. More competition. Higher productivity. More pressure. More convenience. More fun. More anxiety. Intellectual and sensory stimulation. Less privacy. More control. More privacy.[1] More unknowns. Working at home. Shopping and managing financial investments from work. Friction-free capitalism.

Phil Burgess, president of the Center for the New West[2] think tank based in Denver and an insightful observer of social and technological trends, writes and speaks about how big ideas and technology combine to shape society.[3] He points out that big ideas are the drivers of change, and that technology facilitates the process of people understanding, accepting, and taking action on a new big idea. Burgess provides several examples of how this process has worked in history. Two inventions, the astrolabe and the caravel,[4] permitted Christopher Columbus to mount an expedition to pursue his big idea that man could sail west to go east. The Gutenberg printing press let Martin Luther initiate the Reformation in pursuit of his big idea that the Church would not be required for religion if only enough bibles could be put into the hands of the "priesthood of all believers."

Burgess is a close observer of advanced telecommunications technology, which he calls *telecomputing* in recognition of the role of computers and software. He looks around at the revolutionary changes underway and does not yet find a coherent organizing theme. Burgess believes that the big idea to be associated and advanced through telecomputing is still in the process of being born and not yet defined. He sees this lag as natural and expected, since Columbus's big idea came 55 years after the astrolabe and caravel, and Martin Luther's came 62 years after the Gutenberg press.

This essay is a modest attempt to propose a big idea that will be facilitated by broadband, computer-enhanced telecommunications, and provide an overarching meaning of what telecommunications does for society. Over the past few years in the pages of *NTQ*, I have tried to eliminate several candidates for big idea honors. In earlier essays, I have criticized the familiar and well-advocated ideas that advanced telecommunications solves traffic congestion,[5] that telecom is a key to sustainability,[6] and the hoary old chestnut of being able in the information age to do "anything, anytime, anywhere."[7]

So now, in this final issue of *NTQ*, I present for your consideration a simple but big idea that telecom makes possible: *where best to go depends on what you know.*

I mean "go" in the physical sense of where we travel with our bodies. By

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"know," I mean what we perceive in our consciousness from all sources. Expanding this idea, I'm claiming that we can improve our lives by focusing sharply on how we select and interact with the people and places with whom we want face-to-face, physical proximity—customers, colleagues, friends, lovers, the Grand Canyon, grandma's house, the grocery store, a museum, a place of contemplation. We can use telecom to improve how we spend our limited stock of time each day—where we spend it, with whom we spend it, and how we interact.

While telecommunications is the growing enabler of activity at a distance, in fact, its highest value is in helping us allocate our limited time and attention to our physical location and the associated requirement of movement between various locations—with what and whom do we need or want proximity? Telecommunications facilitates a better level and mix of proximity to the people and places we care about. But this only happens when we consciously focus our use of telecom on deciding where and with whom we should be physically close.

Proximity

The big idea proposed here stems from what I believe is an obvious but underemphasized natural law: *Physical proximity is intrinsically and permanently different from telecommunications for many kinds of human interactions and relationships.* Videoconferencing will never equal everyone being in the same room. Distance learning will never be the same as learning in a classroom. Electronic shopping will never be the same as going to the store. The differentiation shows up in performance gaps between the two modes of interaction. I emphasize differences between modes rather than superiority of one mode over the other. Remote interaction is better in some circumstances; face-to-face interaction is better in others.[8] And once we know the difference, the former becomes a way of fine-tuning the latter.

The differences between proximity and remote interaction have many causes:

- Face-to-face conversation or other in-person interaction in a confined, dedicated space can focus attention differently than telecommunicated interaction. A sharper focus of attention can lead to greater reinforcement of learning and retention of information in formal or informal educational sessions.
- Taking a trip to visit someone demonstrates more concern and commitment than a telecommunicated message or interaction.
- Visiting in person allows for sensate input—temperature, vibration, aroma, taste, and crowd noise, for example. Also, the ability to touch a person, animal, or object occurs when a visit is made.
- The information input can be much higher in a physical setting; that is, traveling to a meeting room located in another company allows one to learn more about the organization and its people than interacting with the video images of persons in a meeting room.
- Mixing face-to-face and telecommunications connections in a single meeting creates important qualitative differences in the character of the communications between participants that probably put some participants at a disadvantage. The people sitting with the boss in the conference room may have a distinct advantage in being persuasive in comparison to the group that is coming into the room only via speakerphone or videoconferencing console. This distinction could sometimes motivate the distant participants to try to attend in person.
- Some people have a comparative skill or other advantage in face-to-face communications; they are attractive, intimidating, or are particularly effective in face-to-face conversation. People can also be relatively disadvantaged in the use of telecommunications media such as videoconferencing, and find face-to-face more effective. Training lasting from one to five days makes an enormous difference in the effectiveness of an individual who communicates via a video channel.[9]

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- Power and status are acknowledged when one goes to the office of a powerful or otherwise high-status person. Similarly, visiting the office of a customer can be a demonstration of respect.
- Being in a location or traveling to a place offers the opportunity for peripheral, serendipitous experience. For example, once when on the way to the kickoff planning meeting for a consulting project with the state government of Idaho, I happened to meet and chat with the Governor of Idaho on the airplane from Seattle.
- Visiting in person offers the opportunity to exercise flexibility of purpose at the intended destination and at add-on destinations. For example, one can easily drop in on a customer while "in the neighborhood," even though getting through on the phone may normally be difficult.
- Many feel that confidentiality of communications is more certain when messages and interactions are being handled face-to-face, and not passed through telecommunications channels vulnerable to eavesdropping and recording.
- Many people value proximity to certain special places or people—such as celebrities—quite apart from the operational significance. For example, a person may value a visit to an office where his grandfather once worked quite apart from the functionality of speaking with the present occupant.
- Sometimes the act of traveling itself has value quite apart from the purpose of the trip or the destination. Time to think, time to work, time to relax.[10]

As an overall point that covers several of the specific advantages listed here, research has shown that the relative effectiveness of remote electronic interaction in comparison with face-to-face proximity between people depends on what the actors are trying to do. Research over several decades in various organizational contexts has revealed the most effective tasks for electronic media.[11] For example, in 1994, Fuji in Japan reported the results of research on the effectiveness of remote electronic communications as practiced in their company. These researchers developed a hierarchy of communications purpose, where remote electronic means of communications are more effective at the top of the hierarchy, and less effective at the bottom of the hierarchy (see Table 1).

Table 1
Task Determines Telecommunications Effectiveness

Task	Telecom Network Effectiveness
Sharing of information and knowledge from informed person(s) to uninformed	Highest
Coordination of activities	
Selecting one course of action from a number of options	
Creating information or knowledge from scratch	
Persuasion and negotiation	Lowest

Source: K. Nakamura, et al.[12]

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Significantly, the choice between face-to-face and remote interaction is not symmetric—because of physical limitations, the options for human face-to-face contact are inevitably fewer, more expensive, and more constrained than the options for electronic connection. This is a matter of physical reality. Moving mass is a bigger problem than moving electrons and photons.

The importance of moving people and things along a concrete highway or in an airplane is sometimes under-appreciated by information age cheerleaders, who speak glowingly of the metaphoric information highway as an obvious substitute for transportation. One catchy metaphor popularized in *The Economist* by Francis Cairncross[13] is that telecommunications means the "death of

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distance." Because of the many new ways in which telecommunications makes one aware of distant opportunities for business and pleasure scattered all over the globe, I would argue that geography and distance are more alive than ever in the information age. Surely telecommunicated pictures or interactions with distant people via voice, data, and video generate more human interest in making occasional in-person visits across the miles than if the communication were absent or of lower quality.

The tension between the functionality of using telecommunications networks as a pathway for transactions and relationships versus traveling via cars and planes to face-to-face venues is pervasive in the design, development, and marketing of telecommunications applications. In each case, the advent of telecommunications-enabled options is influencing changes in the face-to-face venues as well. These changes in face-to-face relationships are, in some cases, competitive reactions to the growing power of telecommunications by stakeholders in the traditional venues.

Telecommuting

People with jobs working at home during the day grew by 40% from 1997 to 1998 in the United States.[14] In the quarter century since telecommuting was invented in California, many organizations have learned the circumstances under which critical business processes can be designed for higher performance by allowing flexibility in worker location. But leading issues now include the redesign of the face-to-face office environment, and the frequency for bringing telecommuters back to the office for meetings and resynchronization with the information flowing between people in the office.

Teleconferencing

Meetings of dispersed people using teleconferencing have grown more popular as the audio and video equipment to support it have gotten better, less expensive, easier to use, and more widely deployed. Now, research is beginning to focus on

when face-to-face communication is important for team performance.[15]

Electronic Shopping and Services

The familiar mail-order catalog with its toll-free ordering number is evolving toward online shopping via electronic catalogs on the World Wide Web. But owners and managements in place-based retail are fighting back with stores that are larger, more entertaining, multi-functional, and offer prices just as low.

Distance Learning

The art of positioning teachers in wired classrooms from which they interact with students miles away is becoming more developed and widespread. Yet, the primacy of contact-rich, face-to-face environments to meet the multifaceted developmental needs of children and young adults remains unchallenged.

Tele-health

All manner of unnecessary document and people movement is now avoided through telecommunications in the medical arena, while specialized medical services are extended through interactive telecommunications into remote areas from medical centers in major cities. But critical elements of the doctor-patient relationship remain grounded in the face-to-face, available-to-touch encounter.

Telecommunicated Entertainment

Music, drama, sports, wagering, and lewd images are spreading across ever more TV channels and Internet Websites. At the same time, concerts, plays, cinemas, spectator sports, casinos, and adult entertainment zones draw millions of place-specific audiences who want to enjoy their entertainment up close.

Shaping the Choice

Forces that shape the choice between proximity and remote interaction include the real cost of travel in dollars and time, wishful thinking of individuals, conservative organizational behavior in view of the costs

of change, self-interested technology product vendors, and the undesirable qualities of some face-to-face environments.

The cost of travel always figures in the functional comparison between proximity and telecommunicating. The more difficult or expensive the journey to a remote correspondent, the more appealing telecommunications becomes as a way to "reach" that person or audience. When there is an earthquake, blizzard, or public transit strike that makes urban commuting difficult, the practice of telecommuting soars. When the barrier to transportation falls, so does the level of telecommuting. As another example, studies that measure commuting distance to work find that telecommuters tend to live farther away from the office than non-telecommuters.[16]

Remote solutions, whatever their cost, are typically embraced by individuals even when inappropriate, if telecommunications allows a troublesome issue to be addressed, at least potentially. For example, individuals who hate their office environment, who are really tired of commuting a long distance, or who have childcare responsibilities at home are the first to embrace telecommuting. Wishful thinking sometimes prevails when there are counterindications of appropriateness by reason of the particular job or personality that the individual has. Students who don't want to drive to class, small towns that cannot afford employing a doctor, and business travelers who don't want to travel long distances for brief meetings can also be enthusiastic promoters of remote telecommunications solutions. In all of these cases of wishful thinking, a balanced view of organizational and individual requirements is important to reaching sound decisions.

In a reverse mirror image of individual customer enthusiasm, provider organizations are sometimes conservative and block the possibilities for remote telecom solutions as a substitute for proximity. The general issue in organizations is the management attention and organizational resources for implementing a significant change in policies and processes. For this reason, consultants often recommend that remote telecommunications solutions be applied first and foremost to very significant organizational problems and opportunities, in order to clearly justify the effort required to make a big change.

In a related issue, dysfunctional office design—too many meetings, long lines, difficult vehicle parking, unhelpful sales clerks, poor classroom teaching, and other negative characteristics of face-to-face environments—tend to drive people to embrace remote environments more strongly. In fact, it may be cost-effective from a service provider point of view to improve the face-to-face environment instead of, or even in parallel with, the implementation of remote access. This is especially true if the face-to-face environment is necessarily going to be continued even after the remote access alternative is implemented. For example, if employees want to telecommute because there are too many meetings, management would be smart to investigate how to improve the processes for meetings, as well as the processes for telecommuting to escape from meetings.

Finally, technology vendors looking to expand sales are enthusiastic promoters of telecommuting, teleconferencing, distance learning, and tele-health. The claims of vendors tend to overstate the benefits and applicability of remote solutions generally, as well as hyping the superiority of their own contribution to the application at hand.

Societal Impacts

Two other emerging and related impacts of widespread remote interaction through computer networking that are potentially serious need to be acknowledged: Increasing interest articulation and balkanization of contacts.

Political stability requires interest articulation and interest aggregation at the same time.[17] New opinions need to developed and stated. At the same time, varied opinions need to be reconciled through discussion and compromise. Mass media, political parties, labor unions, and government leaders are the source of interest

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aggregation, which are all growing weaker worldwide. On the other hand, individual interest articulation is naturally stimulated by the Net. Never before have individuals and organizations been so empowered to circulate their viewpoints to the world. The growing lack of balance between the forces for interest aggregation and the forces for interest articulation is a problem.

As another point, because it offers easy pathways to communication with people elsewhere, electronic networking is not a natural tool for interaction within bounded geographic communities. Internet technology lets us turn our attention from our neighbors in a new and unprecedented way, allowing us to easily find and interact with people and ideas and places that are more appealing than what we can find across the street, down the block, or in a metropolitan region.

MIT researchers Van Alstyne and Brynjolfsson show that an emerging global village is not necessarily the outcome we will see from the growth of internetworking. It is also possible that improving communications access through emerging technology will fragment society and balkanize interactions. They argue:

> If IT [information technology] provides a lubricant that allows for the satisfaction of preferences against the friction of geography, then more IT can imply that people increasingly fulfill their preferences. A preference for contact that is more focused than contacts available locally leads to narrower interactions. Thus, local heterogeneity can give way to virtual homogeneity as communities coalesce across geographic boundaries.

> The number of neighbors with whom one interacts is unlikely to exceed a few dozen in a typical day; even in a lifetime, few people have significant relationships with more than a few thousand others. As long as human information processing

capabilities are bounded, electronic media are unlikely to dramatically change this total. When geography no longer narrows interaction, people are able to select their acquaintances by other criteria such as common interests, status, economic class, academic discipline, or ethnic group. The result can easily be a greater balkanization along dimensions which matter far more than geography.[18]

Encouraging Trends

The present environment displays several trends of development in support of functional human proximity that should be further encouraged:

- Office designs are starting to reflect the need for different kinds of functional proximity depending on the tasks at hand—teamwork, informal social interaction, and meeting with customers. As telecommuting and mobile work has grown over the past decade, individually-assigned offices have been downsized or even eliminated. Facility space has been reconfigured to be used by groups as needed. This could include teaming spaces, watering holes, and customer interaction spaces. This movement toward more creative functionality was stimulated by the realization that a large proportion of individually-assigned territorial office space is empty when the assigned occupants are working at home or in the field.[19]

- Commercial spaces increasingly recognize and respond to the human interest in variety and stimulation. Shopping malls are adding food courts, electronic game parlors, concert stages, and other entertainment functions to raise the attractiveness of in-store shopping in the face of greater traffic congestion and the alternative of catalog shopping that is increasingly Internet-enabled. Related to this is the expanding professional urban planning emphasis on pedestrian-oriented, mixed-use, residential/commercial

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neighborhood design that attempts to create an attractive, high-density street life accessible by mass transportation. In support of these trends, planners in advanced urban areas need more understanding of the connection between land use and telecommunications, especially as retail economics and consumer preferences for variety and low prices are impacted by telecom.[20]

- Intelligent transportation systems—the vigorous application of telecom in support of efficient surface transportation—is a rapidly-growing field of technology application.[21] More work is needed to make information streams available to drivers to mitigate inefficiencies in vehicle movement, for example, information on best routing and available parking.

- Community networking is a recent development in support of geographic communities.[22] This means people in a local geographic area are using the Internet for civic purposes. Community networks try to focus on increasing participation in local politics and community improvement: For example, building awareness of a community problem or issue; changing the political process; working to modify some physical aspect of public space such as the parks, libraries, public schools, or streets; or helping disadvantaged citizens. The most effective community network Websites supplement and add value to other community development and activist processes that are focused on the same issues in the same geography. These processes usually involve a lot of face-to-face interaction. There are now indications that major telecommunications providers are trying to coordinate their infrastructure and service development plans with the efforts in community networking.

Conclusion

Telecommunications can enable us to improve the quality of the time we spend in proximity to people and places. But if the big idea this focus represents is unappreci-ated and not widely embraced, the power of technology misapplied will likely send us in another direction.

Replacing face-to-face physical proximity with remote interaction is a growing success. However, there are disruptive, unintended consequences of remote interaction. Teleworking and electronic service delivery are tools so effective along some dimensions that they will inevitably be misapplied by organizations. Misapplication occurs when organizational managements undervalue the benefits of face-to-face physical proximity and let inadequately developed networking applications break down the community. In most cases, telecommuting and other forms of networking should be clearly identified as a supplementary workstyle and lifestyle, not a central organizing principle.

Face-to-face environments—offices, school classrooms, clinics, and retail stores, for example—have evolved over a long period of time, at a pace that supports evolutionary changes in human behavior. It is reasonable that a shift toward more widespread use of remote interactive environments—home offices, video classrooms, home health care, and electronic shopping—will be accepted only slowly and cautiously to allow human behavior to synchronize with the technology.

In this regard, the dichotomy between those who like the spread of one-way instant messaging tools such as fax, e-mail, voice mail, and paging, and those who think it is dehumanizing communications away from interaction is interesting and pertinent. Some people feel that they are always talking to a machine instead of a person, but others believe that asynchronous messaging enables them to maintain better connection with people. Both are right, and it is taking some time for the former impression to embrace the latter result.

While telecommunications, including wireless and the Internet, is a powerful tool that permits radical restructuring of internal organizational processes and external customer service routines, there is something to be said for a cautious, measured

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introduction of new applications at a pace that gives people the time to learn to make productive changes in their behavior with respect to these tools.

Furthermore, mass adoption of worldwide networking can produce negative social consequences even when many organizations individually apply it well for their own ends. The negative consequences are balkanization and an overemphasis on individual interest articulation at the expense of interest aggregation. Face-to-face community, on the other hand, has under-appreciated positive externalities. Enhancing physical proximity and community should be the ongoing central organizing focus of telecommunications applications. The vast possibilities of worldwide interaction and the World Wide Web of the Internet can be tools from cyberspace that help people know where they should go in real space.
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[1] Lest the availability of privacy seem unreasonable, note the argument of Peter Huber in "Screen Play," *Reason* (May 1993):45-46: "The network is boundlessly public but also private as the womb.... The power is in the individual's hands, and his alone."

[2] http://www.newwest.org.

[3] Philip Burgess, "Telecomputing and the New InfoCulture," Keynote speech, Southern California Executive Leadership Forum, Los Angeles, CA (October 13, 1998).

[4] An astrolabe is a navigation instrument that determines the angular distance of a star above the horizon, and a caravel is a type of small sailing ship.

[5] J. S. Niles, "Telecommunications Won't Eliminate Traffic Congestion,"*New Telecom Quarterly*, Vol. 1, No. 4 (November 1993):19-23.

[6] J. S. Niles, "Information Infrastructure: No Easy Road to Sustainable Development," *New Telecom Quarterly*, Vol. 3, No. 4 (November 1995):20-23.

[7] J. S. Niles, "Antidote to the Anytime, Anywhere, Anything Syndrome," *New Telecom Quarterly*, Vol. 4, No. 4 (November 1996):50-55.

[8] J. Hollan and S. Stronetta, "Beyond Being There, Human Factors in Computing Systems," *CHI '92 Conference Proceedings* (1992), pp. 119-125.

[9] Parker Lindner, Principal, New Media Matters, personal communication (November 3, 1998).

[10] I. Salomon and P. L. Mokhtarian, "What Happens When Mobility-Inclined Market Segments Face Accessibility-Enhancing Policies?" *Transportation Research,* Vol. 3, No. 3 (1998):129-140.

[11] J. Short, E. Williams, and B. Christie, *The Social Psychology of Communications* (New York: John Wiley, 1976).

[12] K. Nakamura, et al. "Role of Multimedia Communication in the Teleworking and Telelearning Field," *Proceedings of the Pacific Telecommunications Council Sixteenth Annual Conference* (January 1994).

[13] "Death of distance" is a phrase coined by Frances Cairncross in *The Economist* magazine and described fully in her book *The Death of Distance: How the Communications Revolution Will Change Our Lives* (Cambridge, MA: Harvard Business School Press, 1997). The phrase is unfortunate, because I have heard many take it to mean that distance is becoming less important in some grand sense, not an interpretation with which I judge Cairncross would agree. She mostly means death of distance as a determinant in the price of telecommunications to users.

[14] Tom Miller, personal communication (September 8, 1998). He has conducted an annual household survey of work-at-home throughout the 1990s.

[15] M. Citera, "Distributed Teamwork: The Impact of Communication Media on Influence and Decision Quality," *Journal of the American Society for Information Science*, Vol. 49, No. 9 (1998):792-800.

[16] P. L. Mokhtarian, "Now That Travel Can Be Virtual, Will Congestion Virtually Disappear?" *Scientific American* (October 1997) posted at http://www.sciam.com/1097issue/1097mokhtarian.html.

[17] Philip Burgess, "Telecomputing and the New InfoCulture."

[18] M. Van Alstyne and E. Brynjolfsson, "Electronic Communities: Global Village or Cyberbalkans?" Posted at http://web.mit.edu/marshall/www/Abstracts.html.

[19] International Workplace Studies Program, Cornell University, http://iwsp.human.cornell.edu.

[20] D. Nelson and J. Niles, "Market Dynamics and Nonwork Travel Patterns: Obstacles to Transit-Oriented Development?," Paper presented at the Annual Meeting of the Transportation Research Board, Washington, DC (January 12, 1999). Posted at http://www.globaltelematics.com/tod99trb.htm.

[21] The U.S. Department of Transportation ITS Program, http://www.its.dot.gov.

[22] The Association for Community Networking, http://bcn.boulder.co.us/afcn.