This attitude has already surfaced within the artistic community itself, as well as in advertising and publishing.[184] Although many of these innovative tools for cutting and pasting are still relatively expensive and unavailable, they may be more accessible in the future. With wider deployment of such techniques, artists, photographers, and musicians may find it increasingly difficult to track or trace the uses of their work. Hence, by virtue of their ability to increase access, these technologies may pose problems for the intellectual property system and for the integrity of the creator's work.

[184] Carol Risher and Jon Baumgarten, "The American Experience: Two Views of Electrocopying," *Publishers Weekly*, July 14, 1989, pp. 52-53.

Chapter 8

Communication and the Individual

CONTENTS

Box

Chapter 8
Communication and the Individual

INTRODUCTION

Virtually every aspect of an individual's existence involves communication. Whether trying to make a decision, keep in touch, hunt for a job, or relax at home, individuals are highly dependent on the web of communication systems and the mechanisms that surround them. Individuals' lives are shaped in part by the communication tools available to them, and by the information networks in which they participate.

Traditionally, technological innovations have been a mixed blessing for the individual. New technologies have improved the lives of some; posed problems for others; and changed the nature of daily life for almost everyone. The advent of television, for example, may have brought greater awareness and companionship to many people, but it also brought the questionable impacts of advertising, graphic violence, and TV-delivered morality.

Communication systems used by individuals have evolved in response to and in tandem with social and demographic change. Today's trends foreshadow future communication needs and suggest directions for the adoption of technology. For example, the U.S. population is aging and becoming more ethnically and linguistically heterogeneous. Thus, communication systems may be called on more and more to compensate for lack of mobility, or to translate or customize certain information.

New communication capabilities may offer dazzling opportunities to amplify the powers of human talent, substitute convenience for drudgery, foster social interaction, make education more universally and continuously available, provide new flexibility in working and living arrangements, and so on. At the same time, however, they may threaten to erode personal privacy, sharpen social inequalities, and create frustration and isolation. Moreover, the technologies that create opportunities for some may create problems for others.

As new capabilities emerge, conflicts will arise among stakeholders over priorities in implementing the technology. New control and screening capabilities in the telephone system, for example, may pit guardians of personal privacy against direct-marketers. New tools for creative expression may cause friction between individuals who want access to raw informational material and those who hold the intellectual property rights to that material.

This chapter will examine the opportunities and problems that the new technologies pose from the point of view of the individual. It will:

- describe different ways of looking at individual communication needs;
- examine a number of opportunities and limitations posed for individuals by new technologies; and
- examine some of the factors, such as literacy and ability to pay, that may determine whether and how individuals will be able to use the new systems.

THE COMMUNICATION NEEDS OF INDIVIDUALS

Gauging the communication needs and desires of individuals has always been difficult. The history of modern communication media is strewn with embarrassing predictions and assumptions, such as Harry M. Warner's 1927 statement: "Who the hell wants to hear actors talk?"

Nonetheless, analysts with a variety of perspectives-public policy, marketing, academic, and consumer advocacy--continue to try to identify and define "communication needs." There are several approaches to this task, each with its own strengths and weaknesses.[1] This section discusses four distinct approaches:

1. measuring today's behavior as a blueprint for the future;
2. asking people what they want and why;
3. considering demographic and social trends in forecasting future needs; and
4. trying to identify the fundamental, underlying reasons why people communicate.

[1]For a discussion of battles between behaviorists and cognitive psychologists over how 10 measure needs, see "what Do People Want, Anyway?" *The New York Times, Nov. 8, 1987,* p. 11.

Approach 1: Measuring Today's Behavior as a Blueprint for the Future

Looking at how people presently communicate is perhaps the most obvious way to determine how they might want or need to communicate in the future. It is also, on the surface, the most straightforward and objective approach. Furthermore, technology is quickly improving our ability to measure some types of communication behavior. Libraries with new online circulation systems, for example, can better find out which books are circulating, and among which user populations.[2]

However, controversy over television's rating systems indicate that this approach is not without its problems.[3] Measuring behavior and determining what the measurements really mean are both difficult. While it is often possible to figure out who is using a communication system, it is not always easy to tell what people are using it for. In other words, you can find out how many people are buying the newspaper, but not necessarily what sections they are reading.[4] Or you can tell definitively how many people are using the telephone, at what time of day, but not what they are talking about. Nor are data on current behavior always available in a comprehensive form, both because of their value as a proprietary strategic weapon in the marketplace and because this kind of information is not always collected systematically. When data are available, they are often contradictory. For example, a recent Harris poll showed a drop in concert and performing-arts' attendance, but the figures were vigorously disputed by concert and performing-arts' associations.[5]

Another problem with the "present behavior" approach is that people's communication behavior is sometimes more indicative of their options than of their preferences. In the case of television programming, one scholar claims: "Scheduling factors ... appear to confound any observed relationship between preferences and viewership."[6] Widespread participation may not mean people are completely satisfied with a system or service. Conversely, low use of a system or service may reflect its shortcomings rather than a lack of need for it. If only a small percentage of the population uses libraries, is there little need for libraries or is there a great need for better libraries?[7]

The pitfalls of forecasting needs by projecting from present behavior are perhaps clearest in hindsight. As Russell Neuman points out:

> If we had tried to estimate the market demand for photocopiers 25 years ago based on the total market for carbon paper, we would have been off by several orders of magnitude.[8]

Small differences in quality, e.g., in ease of use, can translate into large differences in degree of use.[9]

Finally, the behavior-measurement method falls short in light of the widely accepted assumption that people will increasingly do things via communica-

[2] As Elaine Albright, a librarian at the University Of Maine, explains: "It [forces] us to have a dialogue that we never had before, to see why certain things really aren't being used." Personal communication, Oct. 1, 1987.

[3] "Neilsen Ratings May Be Axed by Networks," *The Washington Post,* Jan. 18, 1987, p. H1.

[4] Christine D. Urban, "The Competitive Advantage of New Publishing Formats," *Electronic Publishing Plus* (White Plains, NY: The Washington Program of the Annenberg School of Communications and Knowledge Industry Publications, 1985).

"'Poll Finds Arts Attendance Has Declined," *The New York Times,* Mar. 16, 1988, p. C19.

[6] Carrie Heeter, "Cable and Program Choice," Dolf Zillmann and Jennings Bryant (eds.), Selective *Exposure to Communication* (Hillsdale, NJ: Lawrence Erlbaum Associates, 1985), p. 204.

[7] For low use of libraries by the general public, see Ching-chih Chen and peter Hernon, *Information Seeking: Assessing and Anticipating User Needs (New* York, NY: Neal-Schuman Publishing Co., 1982); and Brenda Dervin, "Communication Gaps and Inequities: Moving Toward a Reconceptualization," Brenda Dervin and Mel Voigt, *Progress in Communication Sciences (Norwood,* NJ: Ablex Publishers, Inc., 1980, vol. 2), pp. 73-112. Another potential telecommunication benefit that raises this question is that of "online" provision of health information. The Consumer Federation of America, in comments to Federal Judge Harold Greene, noted that elderly and low-income individuals are much less likely than the rest of the population to consult with health care service providers over the phone, and the elderly are less likely to use health information lines. (Response of the Consumer Federation of America, United Church of Christ Office of Communication, and the United States Public Interest Research Group to Comments on the Report and Recommendations of the United States Concerning the Line of Business Restrictions Imposed on the Bell Operating Companies by the Modification of Final Judgment, Mar. 13, 1987, p. 12). But does that mean that they would not use an 'online' health information resource?

[8] W. Russell Neuman, *The Media Habit* (White Plains, NY: Electronic Publishing Plus, The Washington Program of the Annenberg School of Communications and Knowledge Industry publications, 1985), p. 9. This is true even when the projection is near-term. Neuman points out, for example, that media executives often fail miserably at predicting demand for programming for today's technology-the majority of movies and TV shows simply flop. Ibid., p. 6.

[9] See, for example, Gary Stix, "What Zapped the Electronic Newspaper?" *Columbia Journalism Review,* vol. XXVI, *No.* 1, May/June 1987.

tion systems that they currently do in person, or that they currently don't do at all. If new capabilities encourage applications that have previously been impractical, it is difficult to imagine what those new applications might be simply by focusing on traditional applications.

For a summary of individuals' use of communication systems, including traditional, well-entrenched, and emerging systems, see box 8-A.

Approach 2: Asking People What They Want and Why

Another approach to needs' analysis is to ask people, through surveys, polls, and focus groups, what communication capabilities they want, or what they think of a hypothetical communication capability. This approach assumes that people can evaluate a communication capability before actually using it in a concrete, daily setting. With rapidly changing communication and information technologies, this may not always be possible.[10] For one thing, the immature prototype systems on which people often base their opinions are not always very representative of how the technology will evolve. And it can be very difficult to ask enough questions and present enough scenarios to illustrate the range of possibilities. Yet, accurate judgments about pricing, ease of use, convenience, and a host of other characteristics can be crucial in predicting usage.[11]

Notwithstanding these difficulties, it is tempting to try to infer from the data that are available. In the Harris poll on the arts, for example, 32 percent of those surveyed said there were not enough arts events and institutions in their areas.[12] Can it be inferred that they need more access to arts events via communication systems? Or would only in-person access alleviate this perceived deficiency?

In our marketplace-oriented society, needs are often defined by people's willingness to pay. However, it may be a mistake to equate "wants" with "needs." People may not know, particularly in advance, "what's good for them." This argument is often made, for example, with respect to television.[13]

Approach 3: Considering Social and Demographic Trends in Forecasting Future Needs

A third approach to assessing needs is to identify social and demographic trends that influence how people communicate or how they might communicate in the future. It is universally agreed, for example, that the U.S. population is getting older. It is also widely believed that elderly persons frequently suffer from decreased mobility, loneliness, and the frustration of not being able to contribute to society as productively after retirement. Finally, some say that economic realities will force our society to find ways to keep the elderly participating in the work force longer. Taken together, these trends have led many to predict the need for communication systems that support increased involvement for the elderly.

There are many other social and demographic trends that one could identify, for the purpose of inferring communication needs. Some examples are:

- There are more women working outside the home. By 1986, nearly 52 million women were working, about 200 percent more than at the end of World War 2.[14] One inference that might be drawn from this trend, for example, is that there may be a greater demand for time-saving technologies, such as shop-at-home.
- There are more single-parent families. This trend might suggest the need for telework opportunities, as might the following trend.
- Traffic congestion and commuting times are increasing in many large metropolitan areas.[15]
- The number of non-English-speaking residents is rising, especially persons of Hispanic and

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[10] In a recent National Regulatory Research Institute study of 1,000 business and 2,000 residential telephone subscribers in Ohio, less than 40 percent could name any new telephone service they would need in the next 5 years. *BOC Week, Nov. 16, 1987.*

none 1985 survey, for example, found that although 44 percent of personal- computer users thought they *would* use their machines for "education," only 12 percent actually did; of the 19 percent who thought they would use them for "home budgeting/management," only 7 percent actually did. Evan Roth, "Power Surge in Personal Computers," *Editorial Research Reports,* vol. 1, No. 1, Jan. 9, 1987, p. 6.

12 "Poll Finds Arts Attendance Has Declined," Op. Cit., footnote 5.

[13] See, for example, Robert MacNeil, "Is Television Shortening Our Attention Span')" National *Forum,* vol. LXVIII, No. 4, fall 1987, p. 21.

[14] David E. Bloom, "Women and Work," *American Demographics, vol. 8, No. 9,* September 1986, pp. 24-30.

[15] Robert Dunphy, "Urban Traffic Congestion: A National Crisis?" *Urban Land,* vol 44, *No.* 10, 1985, pp. 2-7.

Box 8-A—Data on Technology Use

The average person watched about 30 hours of TV per week in 1986. Women and elderly persons watched more, and there was little variation by household income.[1] The 1986 top 10 network programs were primarily entertainment-oriented shows: The Bill Cosby Show; Family Ties; Cheers; Murder, She Wrote; Golden Girls; Night Court; 60 Minutes; Growing Pains; and Moonlighting. The top 10 syndicated programs were: Wheel of Fortune, Jeopardy, PM Magazine, the New Newlywed Game, MASH, People's Court, Three's Company, the Oprah Winfrey Show, Southwest Conference Football, and the Phil Donohue Show.

A 1983 study found that the average American spent about 11 hours per week on all forms of reading material. About one-half mid books and spent an average of about 9 hours per week on them. Of these people, 40 percent read for "pleasure or recreation," and 27 percent for "general knowledge."[2]

Of the magazines we read, 21 percent are sports magazines (by number of titles, not circulation). Fourteen percent are general editorial, 6 percent travel, 5 percent crafts/hobbies, 4 percent each for music, literary, home/garden, art/antiques/amusements, 3 percent women's, 31 percent all others.[3]

Our household-originated mail consists primarily of bill payments (36 percent), greeting cards (21 percent), responses to ads (15 percent), letters to friends or relatives (11 percent), and invitations or announcements (4 percent).[4]

Most telephone calls are made for social reasons to the same handful of friends and family. One recent study found that the average household's five most frequently called numbers accounted for over two-thirds of all their calls, However, it is difficult to establish very precisely how people use the telephones

The number of videocassettes households rent or buy rose from a median of 5.8 in 1984 to 22.6 in 1987 (during the same period, VCR penetration increased from 17 to 55 percent).[6]

Fifty-eight percent of Americans visit a library at least once a year, women more than men, and people with household incomes between $20,000 and $50,000 more than others.[7]

What are people using their computers for? A survey of members of the largest U.S. computer users group showed that 66 percent use their [home, not office] computers for word processing, 42.8 percent for entertainment, 33 percent for spreadsheet work, about 30 percent each for communications, programming, and database management, 28 percent for education, and 23 percent for budgeting.[8]

What are online computer conferencing networks being used for? One content analysis of an experimental system in California showed that 15 percent of all messages were "interpersonal" (mostly advice giving and seeking), 14 percent were "graffiti" (idle or obscene comments), 13 percent were "insults or alliance building," 10 percent were buy/sell advertisements, 5 percent social comment (mostly political), 4 percent "public service," 4 percent about the system itself, 3 percent about housing, 3 percent about music, 2 percent jokes, 2 percent event announcements, and the rest miscellaneous.[9] Other online systems cover a wide variety of subjects. The Whole Earth Electronic Link, for example, harbors conversations *on* movies, local and national politics, science fiction, the stock market, gardening, spirituality, business, and even the WELL itself.[10]

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[1] "Television: 1987 Nielsen Report," The A.C. Nielsen Co.

[2] Joseph F. Brinley, Jr., "The 1983 Consumer Research Study on Reading and Book Purchasing," John Y. Cole (ed.), *Books In Our Future: Perspectives and Proposals* (Washington, DC: Library of Congress, 1987).

[3] IMS directory of publications, 1986.

[4] "U.S. Postal Service Household Diary Study," November 1987, USPS Office of Rates.

[5] "Low-Income Households in the Post-Divestiture Era: A Study of Telephone SubscriberShip and Use in Michigan," study prepared by the Michigan Citizens Lobby for the Michigan Divestiture Research Fund, October 1986. See also B.D. Singer, *Social Functions of the Telephone* (Palo Alto, CA: R&E Associates, 1981); Martin Mayer, "The Telephone and the Uses of Time," Ithiel de Sola Pool (cd.), *Social Impact of the Telephone* (Cambridge, MA: The MIT Press, 1977).

[6] "Poll Finds Arts Attendance Has Declined," The New York Times, Mar. 16, 1988, p. C19.

[7] American Library Association, "Libraries in an Information Society: A Statistical Summary," June 1987.

[8] Boston Computer Society.

[9] Susan Douglas, "The Segmented Society: Can New Technologies Narrow the Gap," San Francisco State University, 1987.

[10] For more information see Mick Winter, *The Complete Guide to the WELL* (Yountville, CA: self-published, 1986).

Asian origins. This trend suggests the need, perhaps, for translating devices.[16]

Other trends are more derivative, and thus less reliable in assessing needs. They might include, for example:

- The complexity of life may be increasing, if gauged by the number and nature of the decisions that individuals face and the types of information they must assimilate to make decisions on matters such as health, for example. Such a trend might suggest a greater need for information access.
- A developing emphasis on self-improvement, which might foretell an increased demand for training and educational applications of communication and information technologies.
- A decline in overall free or leisure time, which would suggest the need for time-saving technological applications.[17]

Approach 4: Trying To Identify Why People Use Existing Communication Systems

Using more systematic and theoretical approaches, many researchers have sought to interpret the role of communication systems in people's lives. A sampling of these approaches follows.

Pioneered by Harold Lasswell in the 1940s, mass media theory identified four major functions of the media:

1. alerting individuals to shifts in their social, cultural, or political surroundings ("surveillance");
2. providing facts and analysis useful in decision-making or opinion formulation ("correlation");
3. facilitating escape ("entertainment"); and
4. providing a focus for social interaction and a means of obtaining information that can be used socially or to enhance status ("socialization").

Uses and gratifications theory, which emerged in the 1970s, claimed that media use is motivated both by "gratifications" (defined as "transitory mental or emotional responses that provide momentary satisfaction"), and by "uses" ("the anticipation of attaining pragmatic goals such as learning new behaviors, solving problems, making decisions, coping with environmental forces, reducing uncertainty, and strengthening predispositions' ').18 This theory also acknowledges that media use is often "deficit-motivated' '—that is, that people use media to relax, to relieve tension or fatigue, to kill time, to avoid boredom and loneliness, and to evade social conflict or psychological problems .19

The theory of *parasocial interaction,* introduced by Horton and Wohl in 1956, claims that mass-media users, particularly television-viewers, find friendship and intimacy in mass communication systems by developing "relationships" with persons in the media.[20]

Interpersonal communication theory holds that communication is crucial to the establishment, maintenance, and termination of human relationships, and to establishing and sustaining individuals' self-concepts. [21] Also cited as important functions are: informing and being informed, forming attitudes and beliefs, making decisions, attaining pleasure, assessing values, maintaining values, generating social change, and expressing ideas and innermost feelings.[22]

Each of the four approaches to identifying communication needs has its own strengths and weaknesses. These approaches, however, are not mutually exclusive, and each can contribute to the

[16]The number of Hispanics in the United States has grown by 30 percent since 1980, four times faster than the population as a whole. Joe Schwartz, "Hispanics in the Eighties," *American Demographics,* vol. 10, No. 1, January 1988, pp. *42-45.*

[17]"Poll Finds Arts Attendance Has Declined," op. cit., footnote 5. See also John P, Robinson, "Trends in Americans' Use of Time: Some Preliminary 1975-1985 Comparisons," Survey Research Center, University of Maryland, College Park, MD, December 1986.

[18]Charles K. Atkin, "Informational Utility and Selective Exposure to Entertainment Media," Zillmann and Bryant, op. cit., footnote 6.

[19]For more on this approach, see E. Katz, J. Blumler, and M. Gurevitch, "Uses and Gratifications Research," *Public Opinion Quarterly,* vol. 37, 1973-74, pp. 509-523.

[20]Alan M. Rubin et al., "Loneliness, Parasocial Interaction, and Local Television News Viewing," *Human Communication Research,* winter 1985.

[21]See, for example, Donald P. Cushman and Dudley D. Cahn, Jr., *Communication in Interpersonal Relationships* (Albany, NY: State University of New York Press, 1985).

[22]Rebecca Rubin et al., "Interpersonal Uses of Communications," paper prepared for the annual meeting of the International Communications Association (ICA), Montreal, Canada, May 1987. See also C.C. Arnold and K.D. Fransen, "Conceptions of Rhetoric and Communication," C.C. Arnold and J.W. Bowers (eds.), *Handbook of Rhetorical and Communication Theory* (Boston, MA Allyn and Bacon, 1984).

analysis in this chapter. To incorporate them all, however, it is necessary to stand back and focus not so much on communication needs per se, but on what people's needs are as individuals, and to ask how communication and the new communication technologies might best fill those needs.

OPPORTUNITIES PROVIDED BY THE NEW COMMUNICATION TECHNOLOGIES

An approach that focuses on the needs of individuals assumes that human beings have a fundamental nature, a nature that can be observed and defined. This assumption is not new; it has formed the basis of both Eastern and Western religious thought, as well as political and social ideologies ranging from humanist philosophy to existentialist psychology .23 There is some historical consensus, moreover, not only about the existence of human nature, but also on the subject of the human being's most basic needs. From Aristotle to Spinoza, Goethe, and Ibsen, poets and philosophers through the centuries have conceived of individuals as being compelled to search for the meaning of life through their individual endeavors to fulfill their potentials. This same perspective is repeated in art and literature.[24]

Psychologist Abraham Maslow also addressed the subject of human needs, which he viewed as being ordered in a particular hierarchy.[25] The basic survival needs, such as food and shelter, come first, followed in order of importance by needs for safety; belonging and relatedness; ego, relating to one's position within a group; and self-actualization, autonomy, and creativity. Individuals seek fulfillment of their higher-level needs only after they have satisfied their lower, more basic needs. The full development of the individual, however, requires attention to those at the top of the hierarchy.

Communication and communication technologies are basic to all that an individual does. The following discussion of opportunities and constraints examines the uses of technology in a whole range of activities that, together, might contribute to the individual's meeting all of the basic needs as defined by Maslow. The activities examined include:

- education and self-improvement;
- counseling and psychological support;
- recreation and leisure, entertainment and self-expression;
- social interaction;
- economic participation;
- personal business;
- controlling and manipulating technology-mediated interactions; and
- overcoming barriers to physical mobility.

Education and Self-Improvement

In a 1984 Gallup poll, 41 percent of the general public who responded ranked "encouraging lifelong learning" as the most important goal of the education system.[26] This response is not surprising, given that continuing education is prevalent in the United States today and is becoming more popular all the time. Overall, approximately 23 million people over the age of 17, or 13.5 percent of all adults, participated in some kind of part-time education in 1983. nearly double the number reported in 1957.[27]

New communication technologies could enable more individuals to take advantage of opportunities for convenient and effective education and self-improvement, both formal and informal. In the past, avenues for informal self-improvement—from

[23] Erich Fromm, *Beyond the Chains of Illusion: My Encounter with Marx and Freud* (New York, NY: Simon and Schuster, Inc., 1962). Writing On behalf of this notion, Erich Fromm notes, for example: "The question is by no means of a purely academic nature. If men differed in their basic psychic and mental structure, how could we speak of humanity in more than a psychological and anatomical sense? How could we understand the 'stranger' if he were fundamentally different from us? How could we understand the art of entirely different cultures, their myths, their drama, their sculpture, were it not for the fact that we all share the same human nature?"

[24] Characterizing human growth, the 20th century humanist psychologist, Karen Homey, writes: "The human individual, given a chance, tends to develop his particular human potentialities. He will develop then the unique alive force of his real self; the clarity and depth of his own feelings, thoughts, wishes, interests; the ability to tap his own resources; the strength of his will power; the special capacities or gifts he may have; the faculty to express himself; and to relate himself to others with his spontaneous feelings. All this will in time enable him to find his set of values and his aims in life. In short, he will grow, substantially undiverted towards self realization." Karen Homey, *Neurosis and Human Growth: The Struggle Towards Self Realization (New* York, NY: W.W. Norton, 1950), p. 17.

[25] Abraham Maslow, "A Theory of Motivation," *Psychological Bulletin,* vol. *50,* July 1943, pp. 370-396.

[26] *Phi Delta Kappa,* The Gallup Poll of Teachers' Attitudes Toward the Public Schools, part 2, January 1985.

[27] U.S. Congress, Office of Technology Assessment, *Technology and the American Economic Transition: Choices for the Future,* OTA-TET-283 (Washington, DC: U.S. Government Printing Office, May 1988), p. 128.

"how-to" books to private lessons-have had very little to do with formal instruction through educational institutions. New technologies could potentially break down this barrier by making more of the institutional curricula available in a more appealing and attractive format for the home.[28] Recently, for example, "how-to" videotapes are proliferating on subjects ranging from golf and cooking to "How To Build a Gazebo" and "Teaching Your Parrot To Talk."[29] Books-on-tape, convenient for filling niches of time (for example, while driving to work), are also very popular. The sale of nonmusical audio cassettes generated $175 million in revenues in 1985.[30]

Meanwhile, schools and corporate training centers are experimenting with new audiovisual tools and formats-including live two-way audio and video remote-teaching systems—that, in many ways, resemble traditional home-entertainment media. The University of Maine, for example, is using fiber optics, satellites, and cable TV systems to provide interactive multimedia courses to underpopulated areas of the State, in some cases piping courses directly into individual homes. The Annenberg/Commission for Public Broadcasting project has funded several experiments on a new system that allows students at a remote classroom site to receive freeze-frame video or graphic images, superimposed with notations from an instructor's pen, over normal telephone lines.[31] And several universities—including New York's New School for Social Research, Purdue University, the New York Institute of Technology, and Nova University-offer online access to text-only courses for credit toward degrees or other credentials .32

Other efforts leave out the telecommunication component; one law school is using optical disk-based interactive video programs to simulate courtroom situations.[33] Students, acting as lawyers, can participate (raising objections, for example) by typing instructions on a keyboard. The video then jumps to a point where the judge or opposing counsel responds to the particular objection. Such systems are also being used to let students perform simulated chemistry experiments, practice cardiopulmonary resuscitation, or learn how to weld metal seams.

Such experiments are precursors of the type of system that might provide home access to America's educational infrastructure.[34] Much attention has already been focused on the potential of educational video. Video is being used to train and teach in a variety of settings. The Public Broadcasting Service's National Narrowcast Service, for example, broadcasts educational programming via satellite and microwave systems to audiences at work sites and college campuses across the country .35 Other groups are importing foreign programming via satellite for language and culture courses.

But critics note that unfulfilled promises of educational benefits have accompanied every wave of new technology, from the radio to the videodisk of the 1970s. And indeed, today's systems face many obstacles. One commentator notes, for example, that although:

> . the telecommunication technologies appear to have the potential to provide access to a wealth of intellectual resources . . . they are being developed in isolation from each other . . . We must find efficient ways to pass along to others both the learning materials that are being pioneered around the country and the teaching ideas that give them Power.[36]

[28] This curriculum has often been available through mail-order or extension courses, but in a less convenient or attractive form.

[29] Carol R. Riggs, "How-To Videos Are Growing Fast," D&B *Reports,* September/October 1986.

[30] John Carey, "Telecommunications Technologies and Public Broadcasting 1986," report prepared for the Corporation for Public Broadcasting, June 1986, p. 65.

31 "Lewning Math in the Space Age," *The Boston Globe*, Mar. 1, 1987, p. 45. For a report on the use of new communication technologies for distance learning, see U.S. Congress, Office of Technology Assessment, *Linking for Learning A New Course for Education, OTA-SET-430* (Washington, DC: U.S. Government Printing Office, November 1989).

320 such courses are offered through intermediary institutions, such as the Electronic University Network, a division of San Francisco-based TeleLearning, Inc., "Turning Computers Into College Classrooms," *Business* Week, Oct 14, 1985. See also Patricia Kirby, "Going to College Via the Computer," *Capital Computer Digest,* June 1988.

33 "Students Hone Skills in Video *Courtroom, '''The New York Times.* Mar. 24, 1987.

[34] Some minimal level of access is already available. There are 30 thriving dial-a-grammar services nationwide, for example, mostty run by university writing centers.

[35] Mara Mayor and peter J. Dirr, "Telelearning in Higher Education," *National Forurn, vol.* LSVI, No. 3, summer 1986, pp. 7-10.

[36] Ibid.

Others have expressed concern that telecommunication-mediated educational services might be used to justify the reduction of support for conventional education. They note that if this were to happen and educational materials were distributed via the marketplace, it could lead to great inequities in educational opportunities and attainment.[37]

Counseling and Psychological Support

Closely related to the need for education and self-improvement is the need for counseling and psychological support in coping with life's problems. In today's environment of high divorce and crime rates, widespread substance abuse, and financial insecurity there is a need for both formal and informal support mechanisms.[38] One indicator of this need is the fact that, although participation in both traditional therapy and less-structured self-help groups is on the rise,[39] experts estimate that most mental health problems are going untreated, mainly because most people with such problems still do not seek professional help.[40]

Today, with the exception of telephone hotlines and book-based systems ("How to Lose Weight," for example), counseling is a face-to-face activity. However, new communication technologies could potentially make psychological support and counseling of many kinds more accessible to individuals, and help overcome the obstacles that typically prevent them from seeking help. In the nascent world of computer-conferencing, dozens of organized fora for sharing advice on general and specific problems have emerged, and experiments with more personalized services, incorporating traditional elements of therapy, are under way.

The online "support groups" were originally pioneered by handicapped and disabled people. Online groups are similar to face-to-face support groups, except that the discussions can be accessed from anywhere in the country, bringing together people with obscure problems who would otherwise never meet. And because they are ongoing, participate-at-your-own-convenience affairs, help is almost constantly available. As one person familiar with such groups noted:

> A guy gets on [a computer conferencing system] and talks about his mother being sick and suddenly there are twelve other people there typing in their thoughts. It can be very supportive.[41]

There has been considerable discussion about using interactive electronic media to supplement or substitute for some types of traditional face-to-face therapies.[42] Such an approach, some claim, might cut down on the distractions of interpersonal proximity that have traditionally plagued therapy.[43]

Computer bulletin boards aimed at behavior modification have also been used experimentally, and in conjunction with traditional therapy, to help individuals set goals for themselves and monitor their progress toward achieving them. "The Health Connection," an online system headquartered in Houston, TX, enables participants to record information about their exercise, diet, and medication. The system then generates graphs showing indicators such as the number of calories consumed and expended. Participants can also send questions to experts online, and search a database of health information. Computers are also being widely used by professionals to administer and evaluate standardized diagnostic tests, such as the Minnesota Multiphasic Personality Inventory.

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[37] "An '~formation Age' for Everyone? Telecommunications and Information Services in California's Future," introductory paper for an informational hearing before the Assembly Committee on Utilities and Commerce, California Legislature, Sacramento, CA, Feb. 1, 1988.

[38] A recent study by the National Institute of Mental Health found that between 29 and 38 percent of adults have experienced a psychiatric "disorder," According to a 1983 Harris Poll, three out of five adults say they feel under great stress at least once a week. Problems with marriage or intimate relationships are the most frequent reason people seek help, followed by depression, relationships with co-workers, parents, or children; lack of self-esteem or feelings of insecurity; substance abuse; personality or character disorders, and sexual problems. See Martha F. Riche, "Behind the Boom in Mental Health Care," *American Demographics, vol. 9, No. 11,* pp. 34-37, 60-61, November 1987.

[39] From 1 6 t. 25 percent of all visits to doctors' offices in the early 1980s were for psychological problems. An estimated 12 million Americans participate in roughly 500,000 self-help groups. Dan Hurley, "Getting Help From Helping," *Psychology Today,* January 1988.

[40] Riche, op. cit., footnote 38.

[41] Vic Sussman, "personal Tech: Let Your Fingers Do the Talking," *The Washington Post Magazine,* Oct. 19, 1986.

[42] For an overview, see Russ V. Reynolds, "Computer-Automated Service Delivery. A Primer," *The Behavior Therapist, vol. 10, No. 5, 1987.* The media under discussion are primarily computer-based, although at least one psychiatrist is already offering therapy via cellular telephone to Los Angeles' motorists enraged at traffic tie-ups. "Car Phones Transforming U.S. Highways Into Moving Telephone Booths," *The New York Times,* Aug. 21, 1987.

[43] For example, some patients become physically attracted t. the therapist; others attribute successes to the presence of the therapist, and then feel unable to achieve them without him/her.

Praising the benefits of online counseling, one researcher notes that changing behavior patterns is more easily accomplished if programs can be tailored to and scheduled into an individual's life. And computer programs are being designed to do just that.[44] Online systems also encourage participants to be more open in discussing their problems, and may allow the therapist to more easily obtain "confirming reports" and assistance from family and friends.

Other experts are less optimistic about the new technology. A number of them warn that technology may dehumanize the helping process. Others are concerned about the problems of quality control. At present, there are no official bodies that set standards or systematically evaluate the quality of therapeutic or self-help software.[45] In addition, issues involving medical confidentiality, malpractice, and liability for actions taken on the advice of online medical programs are still unresolved.

Recreation and Leisure, Entertainment and Self-Expression

From movies to novels to rock-and-roll, "entertainment" has traditionally been one of- the main driving forces in the development of American communication systems.[46] And so it continues today, judging from the time and money spent on it.[47]

Several trends relate to the future of leisure and communication media. First, as already noted, Americans have less and less leisure time,[48] putting a premium on home entertainment to eliminate travel.[49] Second, more entertainment options are becoming available via new technologies in the home, notably cable TV and videocassette recorders.[50] To the degree that most Americans enjoy spectator sports, theater, concerts, and other forms of art and entertainment, they are increasingly able to do so by means of the mass media.[51]

Mass-media entertainment, however, has traditionally been and continues to be primarily a passive activity. in contrast to participatory, communication-related, recreational activities, which have also been on the rise in recent years.[52] One of the promises of new communication systems is that they may offer a new meeting ground for traditionally separate active and passive activities-a way to combine entertainment and self-expression, and foster more active participation and creativity.

Self-expression and participation have always played a role in some mass media formats, from letters to the editor, to radio and TV talk shows, to game shows and shows like "People's Court," where the audience is encouraged to take sides and form an opinion.[53] And there is little doubt that people are interested in expressing themselves, judging from the deluge of artifacts like T-shirts, bumper stickers,

[44]Robert p. Hawkins et al., "Reaching Hard-To-Reach Populations: Interactive Computer Programs as Public Information Campaigns for Adolescents," *Journal of Communication*, vol. 37, No. 2, spring 1987, p. 11.

[45]Christopher Joyce, "This Machine Wants to Help You," Psychology *Today*, February 1988.

[46]Daniel J. Czitrom, *Media and the American Mind:* From *Morse* to *McLuhan* (Chapel Hill, NC: University of North Carolina Press, 1982).

[47]Not everybody has a telephone, but almost every single household has a TV and a radio. Watching television, experts agree, is the mOSt popular leisure pursuit, followed in descending order by visiting or socializing, playing cards or other games, attending movies, making home or car repairs, gardening, exercising, attending sports events, visiting amusement parks, and attending arts events. John Robinson, "The Arts in America," *American Demographics, vol. 9, No. 9,* September 1987, p. 44.

[48]Robinson, op. cit., footnote 17.

[49]Office of Technology Assessment, op. Cit., footnote 27, p.139. And a migration to more home-based entertainment is evidenced by industry statistics. By 1986, movie industry revenues from videocassette sales equaled revenues from box-office movie sales. See also "Studios Woo Cassette Mass Market," *The New York Times,* Feb. 27, 1986, p. C26; and "Poll Finds Arts Attendance Has Declined," op. cit., footnote 5.

[50]Other formats have emerged (such as compact disc audio) or may be emerging (such as direct broadcast satellite).

[51]Most broadcast events have higher media audiences than in-person audiences. One study showed, for example, that while only 13 percent Of the population attended a classical music concertina given year, *20* percent listened to classical music on the radio, and 24 percent watched a classical music performance on television. Robinson, op. cit., footnote 47. See also Jeremy Schlosberg, "Who Watches Television Sports?" *American Demographics,* vol. *9, No. 2,* February 1987, pp. 45-49, 59. For an example of the recent diversity available in entertainment programming, see "Fish Are Jumping on Many TV Screens and the Corn 1s High," *The Wall Street Journal,* June 25, 1987.

[52]The number of painters, authors, and dancers rose at least 80 percent in the past decade; and between 1975 and 1980, the proportion of Americans involved in amateur photography rose from 19 to 44 percent, and of those who play a musical instrument from 18 to 30 percent. Robinson, op. cit., footnote 47; and James Ogilvy, "The Experience Industry," *American Demographics, vol. 8, No, 12,* December 1986, pp. 26-29,59.

[53]For some audience members, the perceived line between reality and make-believe in this genre is thin: real small-claims courts are packed with people citing precedents from the television show, "People's Court." Michael Pollan, "Reality Shows: The Syndicated Bench," *Channels, vol. 7, No. 7,* July/August 1987, pp. 52-54.

coffee mugs, and posters that help people communicate their personalities to the world.[54]

Lately, other forms of pseudo-participation have emerged. There are hotlines that allow people to vote on the fate of their favorite TV characters,[55] and novelty-shop services where individuals can add their personality to a mass-media product by recording their own voice over the instrumental track of a top-40 hit.[56] Another recent phenomenon is the emergence of millions of home-based audio "broadcast" stations, in the form of telephone-answering machines. Several types of technology are emerging, or are being developed, that may strengthen the trend toward participation in entertainment.

Information production tools, for example, are making many forms of self-expression cheaper, easier, and more impressive, shifting the emphasis—as some put it—from perspiration to inspiration. Desktop publishing and design software, for example, enable individuals to produce professional-quality documents, layouts, and all manner of designs. Computers linked to synthesizers are giving amateurs studio-quality capabilities for creating and performing music, and, incidentally, for working collaboratively by trading musical "patches" (digitized musical excerpts) over telephone lines and via computer bulletin boards.[57]

Optical disks, together with authoring software, might further empower the would-be recreator/creator. According to one researcher:

> Future videodisk novels will provide scenes of historic crisis, fantasy castles, or exotic modern locales that the "readers" will people, both visually and imaginatively, with characters of their own choosing.[58]

Such a description may call to mind the video game of the late 1970s, viewed by many as a fad but now making a comeback.[59]

Whether people will take advantage of such new opportunities is uncertain. Although video cameras and tape recorders have been widely available for some time, they have not sparked a new grassroots media genre. This lack of interest may reflect, in part, the dearth of distribution mechanisms available to the individual, as well as a lack of interest in programming not packaged with Hollywood's gloss and slickness. It may also be a sign of limited talent or expertise. As one commentator says of desktop publishing:

> If you don't know what you're doing, you're just going to produce ugly documents faster.[60]

There are, however, notable exceptions. High school and college students across the country are producing video yearbooks. People with access to public cable TV studios are producing a hodgepodge of programs. In New York City, for example, one lady does a weekly singing tribute to Frank Sinatra, and a dentist answers callers' questions about dental work. Talented individuals on shoestring budgets occasionally produce low-gloss, homespun films that succeed because their concept is good,[61]

The evolution of systems for self-expression and participation will also depend on the willingness of traditional information providers to provide raw material on an unbundled basis for repackaging by individuals. It has been said that the second best sports magazine in the United States would be a compilation of the cuttings in the editor's wastebas-

54$x John W. Heeren, "Phrases on Your T-Shirt: Personal Graffiti in Modern Society, " *California Sociologist,* winter 1980.

55When Victoria principal announced she was quitting the TV show, "Dallas," for example, *USA Today* set up telephone lines so people could vote on how the show should cleat with the loss of her character, Pam.

56Other popular items are custom-made sports cassettes, baseball cards, and magazine covers, where the customer is the star who hits the home run in the ninth inning or whose face appears on the card or cover,

57 Between 1983 and 1986, sales of synthesizers soared more than fivefold to 350,000," while sales of brass-band instruments fell about 15 percent to 139,500. "Music Amateurs Find New Inspiration Composing at the Keyboard of Computers," *The Wall Street Journal,* Oct. 29, 1987, p. 29. For more information about Musical Instrument Digital Interface (MIDI), see Michael Boom, *"Music Through MIDI"* (Redmond, WA: Microsoft Press, 1987), and Craig Anderton, *"MIDI for Musicians" (New York, NY:* Amsco Publications, 1986)

58Charles A. Goodrum and Helen Dalrymple, "The Computer and the Book," John Y Cole (cd.), *Books* in *Our* Future" *perspectives and Proposals* (Washington, DC: Library of Congress, 1987), p. 176.

59In 1981, video game arcade-users spent $5 billion—equal to the combined revenues of the Las Vegas gambling industry and the U.S. film industry, or the total television revenues and gate receipts of major league baseball, football, and basketball. Ronald Rice, "New Media Technology: Growth and Integration," Rice and Associates, *The New Media Communication, Research, and Technology* (Beverly Hills, CA: Sage Publications, 1984)

60 "Computers Let a Thousand Publishers Bloom," *The New York Times,* Sept. 8, 1987, p. Al.

61For example, the movies "She's Gotta Have it," financed with the producer's credit cards, and "Sherman's March," shot by one man with his videocamera. Also note the popularity of rock songs redubbed with spoof lyrics— a format pioneered by "Weird Al" Yankovic.

ket at *Sports Illustrated.* But what company will sell its material for such purposes? Will individuals have access to the vast archives of sounds, images, and text as raw material for repackaging? Certainly not without raising a host of intellectual property issues.[62] Moreover, without intermediaries to provide a modicum of quality control, some issues may also arise with respect to content, as in the case of Dial-a-Porn.

Social Interaction

People use communication systems to build and maintain their "networks" of relationships.[63] These relationships are crucial both in satisfying specific needs, such as information-seeking,[64] and in sustaining a general sense of well-being.[65]

Innovations in communication have influenced patterns and characteristics of social interaction, whether among friends and relatives, or strangers. Pool notes, for example, that the telephone reduced loneliness, strengthened family ties, produced discontinuous communities, and generally stimulated social interaction.[66]

The past few years have seen the widespread adoption of telephone-answering machines, making interpersonal communication more convenient, and a drop in long-distance telephone rates, making such communication more practical for more individuals. A whole wave of electronic technologies is poised to revolutionize interpersonal interaction, potentially making such contacts more varied in format, more convenient, more random, more purposeful, or—depending on one's perspective—more impersonal and unsatisfying. The new technologies can be divided into two categories: messaging systems such as facsimile, electronic (text-only) mail, and voice mail; and conferencing systems, which, like conference calls, enable two or more people to communicate interactively at the same time.[67]

The promise of electronic-conferencing systems is that they will encourage new types of social interactions among people who share common interests and among people at random. These systems create new types of situations in which people can meet, broaden the geographic scope of their potential interactions, and take some of the element of coincidence out of meeting people with specific interests. One example of such a technology already in widespread use is audioconferencing, also known as group bridging.[68] These systems allow people to participate in a conference call with a handful of complete strangers. Already active in several cities, these services are developing special lines for specific interest groups such as trivia buffs, soap-opera addicts, rock fans, and born-again Christians. One party-line in Boston even caters to men and women in the midst of divorce proceedings.[69]

One attraction of this type of system is the random contact with strangers it provides—an electronic sort of hitchhiking from the safety of one's telephone. As Robert Kraut, a social psychologist at Bell Communications Research, says:

> It not that different from the anonymity you find on bus rides or plane rides. There's someone you know you can spill your guts to without repercussions.[70]

In contrast, another new electronic meeting-place, the computer conference, better facilitates purposeful contacts. Much has been written about the stereotypical "hackers" who live, breathe, and hold their wedding ceremonies on these systems.[71] Behind this stereotype is a vast and growing universe of conferencing networks—corporate and nonprofit,

[62]For a discussion, see U.S. Congress, Office of Technology Assessment, *Intellectual Property Rights in an Age of Electronics and Information*, OTA-CIT-302 (Springfield, VA: National Technical Information Service, April 1986).

[63]Cushman and Cahn, op.cit., footnote 21, p. 1.

[64]Russell Neuman notes that more people rely on personal friends than organized or institutional sources for important information. Neuman, Op. Cit., footnote 8, p. 8.

[65]Cushman and Cahn, op. cit., footnote 21, p. @.

[66]Ithiel de Sola Pool, "*Forecasting the Telephone A Retrospective Technology Assessment* (Norwood, NJ: Ablex, *1983),* pp. 129-131.

[67]"The line between these two categories is blurry, however, because some systems combine elements of the two by enabling people to participate in a conference by leaving messages that everyone else can see, regardless of when they "check in."

[68]Ken Franckling, *UPI* (Lifestyle), dispatch on group bridging services, Sept. 22, 1987.

@Jack Seamonds, "The Newest Dating Game: Party Lines Are Humming and Also Controversial," *U.S. News and World Report,* June 8, 1987.

[70]Franckling, op. cit., footnote 68.

[71]One researcher characterizes "the hacker" as "an addict who sleeps by day and works at a computer keyboard at night, feeding on junk food and the euphoria of computing." Everett Rogers, *Communication Technology: The New Media in Society (New* York, NY: The Free Press, 1986), p. 235.

academic and commercial. It is estimated that there are between 7,000 to 10,000 private home-based bulletin boards in the United States today .72 These online forums cater to every imaginable interest, from *botany* to arms control to dirty jokes. People with unusual interests can find their niche quickly, sometimes by searching the profiles of other participants to get specific details about them and their interests.

Some claim that electronic conferencing encourages freer communication because without visual and audio cues, such as appearance, tone of voice, and body language, people may be less embarrassed and therefore less inhibited. Says sociologist Sara Kiesler:

> People focus their attention on the message rather than on each other.[73]

Theodore Roszak notes that electronic conferencing systems have "a liberating and leveling effect," encouraging a certain amount of role-playing, because they "blank out race, age, gender, looks, timidity, and handicaps."[74] He adds, however, that more anonymity can mean less accountability, leading to what he calls "nasty material: racist and sexist slurs, dirty jokes, profanity."

While conferencing systems may change the nature of communication between strangers or acquaintances, new capabilities for keeping in touch could also affect closer relationships, in particular those among friends and relatives. The freeze-frame videophone, for example, one of the notorious unfulfilled promises of the 20th century (along with 3-D television and personal robots), shows signs of finally emerging as a popular and economical supplement to the telephone. Matshutsita, which recently began marketing a $300 set that connects to a telephone line, had sold 64,000 of them by May 1988.[75] Although household demand for video communication remains uncertain,[76] many organizations are already using videoconferencing; and as the technology gets cheaper, more are likely to do so.

New technology may also enable geographically dispersed individuals to share more experiences. Communication tools such as the television or the snapshot have often served as a setting or topic for social interaction. Future systems—those that allow people to share work or play games or learn together from a distance--could serve a similar purpose.[77]

Questions arise, however, regarding the hard-to-measure indirect and psychological effects of the new technologies. How effective, for example, is technology-mediated communication as a substitute for face-to-face interaction? Will improved communication capabilities accelerate geographic dispersal of families and friends? Or will they siphon off time spent in face-to-face interactions with nearby friends and neighbors? One indicative dilemma is the new phenomenon of "video visits" to nursing homes. Some have reported that showing videotapes of family members to elderly patients calms them and may make them feel "more involved."[78] One Washington, DC, nursing home has initiated a "Visiting Through Video" program, funded by the Markle Foundation. The videos:

> . . . have been particularly useful in helping staff cheer up residents who may be experiencing depression or having a difficult day . . . The staff benefits as well . . . By learning more about each resident's history and personality, they are able to provide individualized attention and deal more directly with specific problems and concerns.[79]

But some say video visits may also encourage relatives to postpone or avoid visits in person.

With respect to electronic conferences—whether audio, video, or textual-society may need to decide:

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[72] *Whole Earth Review*, Winter 1987; also Steve Johnson, personal communication, May 12, 1988.

[73] Sara Kiesler, "Thinking Ahead: The Hidden Messages in Computer Networks, ''/Harvard *Business Review*, vol. 64, No. 1, January-February 1986, p. 48.

[74] Theodore Roszak, "Partners for D$_{emocracy:}$ Public Libraries and Information Technology," *Wilson Library Bulletin*, February 1986, p. 15.

[75] *Time* Magazine, Apr. 21, 1988.

[76] Only anecdotal evidence is available. One successful experiment, called the "Hole m Space," set Up cameras and TV screens at public locations in Los Angeles and New York so passers-by could see and talk to each other across the continent.

[77] Whether this will happen may depend on whether people perceive these systems as shared social, rather than individual, tools. Information-retrieval tools, for example, if equipped with large display screens that several people could view at one time, might be treated as a fun "game." Most contemporary computer-related technologies (not to mention radio walkmen) have the reverse image: that of a personal shell to withdraw into.

[78] "'Video Visits' Help Elderly and Kin," *The New York Times*, Feb. 25, 1987

[79] Barbie White, "Video Visits Help Families Say 'I Love You,' " *Media & Values*, *No. 45*, winter 1989, p. 20.

- who will be admitted to them, and at what level of participation;
- what types of conferences can be kept private;
- whether content will be regulated—that is, will some types of electronic interactions require a monitor—and whether there will be well-defined rights, roles, and limitations for partici - pants;[80] and
- whether people will be able to conceal their true identity or pretend they are someone else.

Economic Participation

Technological change has historically brought about changes in the ways individuals participate in economic life. In preindustrial times, for example, the family served as the basic economic unit with most people working on a number of tasks, cooperatively, in their homes.[81] Industrialization gave rise to the factory system in which workers were organized to perform ever more routinized and specialized forms of labor.[82] Today, as discussed in chapter 5, new technologies once again create opportunities for changing economic relationships.[83] And, as in the preindustrial era, technology will now allow individuals to more easily work on their own schedules, at their own paces, in their homes. This technical capability, moreover, has come about at a time when, for a variety of reasons, self-employment, moonlighting (multiple job-holding), and part-time work are on the rise and at their highest levels in many years.[84]

One way in which new technologies have created economic opportunities is by lowering the barriers for individual endeavors. One such barrier, for example, is access to markets for professional services. New capabilities such as facsimile transmission, overnight mail, and electronic messaging are enabling knowledge-workers such as writers, programmers, designers, and accountants to do much more freelancing, consulting, and part-time work. Consider freelance photographers, for example. In the past several years, taking advantage of these technologies, services have emerged that, for a fee, inform photographers across the country of editors' photographic needs. One person who runs such a service describes the implications for freelancers this way:

> Before, if you were right next to the flagpole, you got the job. Today, if you're in Colorado and you see a request for a picture of a wildflower with a little bit of snow around it, you can get the job.[85]

Future communication systems could go even further in helping individuals advertise, sell, and deliver their intellectual products. One researcher has noted that France's Minitel:

> . . . seems to make it possible for anyone, with next to no capital, not only to publish . . . but also to capture revenues, all in a single, integrated system.[86]

Technologies for coordinating work activities and enabling more flexible schedules may have a similar impact on the nature of economic participation. Telephone-answering machines, for example, have made it easier for freelancers to hold a daytime job and also keep in touch with customers. More recently, the advent of call-forwarding has made it substantially easier to hire an answering service.

Finally, the increasing capabilities and falling prices of information tools, particularly computers, have stimulated entrepreneurial participation in many industries. This trend is likely to continue. For example, a hot-air ballooning enthusiast in Sacramento, CA, who began publishing his monthly magazine, "Balloon Life" (circulation 2,500), when

[80] Audioconferencing services typically provide a monitor who is responsible for keeping the conversation going and warning about "inappropriate" language. In some areas, audioconferencing systems got off to a rocky start due to criticisms that they were being used for drug deals and for arranging trysts, in addition to the fact that children were running up huge bills without their parents' knowledge. Franckling, op. cit., footnote 68.

[81] Neil J. Smelser, *Social Change* in the *Industrial Revolution: An Application of Theory to the Lancashire Cotton Industry, 1770-1840* (London: Routledge & Kegan Paul, 1959).

[82] Shoshana Zuboff, *In the Age of the Smart Machine* (New York, NY: Basic Books, 1988).

[83] Michael Piore and Charles Sabel, *The Second Industrial Divide* (New York, NY: Basic Books, Inc., 1984). See also ibid.

[84] Of the approximately 700,000 new companies formed in 1985 (compared to 90,000 in 1950), 300,000 consisted of self-employed individuals. Roger Thompson, "Small Business," *Editorial Research Reports,* vol. 1, No. 23, June 19, 1987, p. 305. There are approximately 6 million "moonlighters," working an average of 14 extra hours per week. Richard Worsnop, "Part-Time Work," *Editorial Research Reports,* vol. 1, No. 22, June 12, 1987, p. 294. And there were about 19.5 million part-time workers in 1987, up from 12 million in 1970, according to the Department of Labor's Bureau of Labor Statistics, as cited in *The Washington Post,* Feb. 11, 1988, p. A18. About 3 million of these were '*professionals," with the biggest gains in the ranks of part-time editors, library workers, and accountants. Worsnop, op. cit., footnote 84.

[85] Rohn Engh, personal communication, Apr. 14, 1988.

[86] Michael Rice (ed.), "Toward Enhancing the Social Benefits of Electronic Publishing," report of an Aspen Institute Planning Meeting. 1987.

desktop publishing equipment became available, explains:

> The market is so small, the overhead had to be small to make it a viable product.[87]

Further reductions in the cost of distribution, perhaps via telecommunication, could make such efforts even more viable.

New technologies have also been regarded as the means by which businesses could provide flexible work arrangements, allowing people to perform their jobs at home. Such arrangements, it is argued, will not only increase worker productivity, but will also provide opportunities for people who, because of family responsibilities or physical disabilities, might be unable to work in an office situation.[88] In fact, recent experience with telework has proved that it is relatively successful in both regards.[89] However, it also shows that the technology, in and of itself, will not alter the nature of the work experience. On the contrary, the most successful cases of telework were those in which the traditional organizational principles of the office could be most easily transferred to the home.[90] As Margrethe Olson has noted, for telework to have a major, structural impact on work at home, the office itself will need to be integrated, and the technology will have to go further in assuring that:

- computing power is inexpensive and portable;
- there is access to all information resources required to perform the work in a form that is accessible by computer, requiring that it be both "machine-readable" and "online;" and
- there is access to other people in the organization through communication networks that link all locations, office and home.[91]

New communication technologies will affect individuals' economic lives not only as entrepreneurs and workers, but also as consumers. The increasing number of video transmission channels, for example, allows consumers to browse through a variety of live or taped home-shopping television programming services, and it will not be long before many people can routinely use their VCRs to examine products exhibited on full-motion catalogs, or videologs.[92]

More important to the consumer than browsing is the capability for comparative shopping that videotex services afford.[93] The systems now being used employ a tree-branch menu architecture-requiring a user to perform the motions of entering a store, selecting a department, and choosing a product. New information technologies, however, can engineer quick searches for all listings of a particular product in an entire catalog/mall, allowing consumers to compare and sort the relevant lists according to their own particular criteria. This opportunity could be extended even further, so that single catalogs are created to include listings of all products available from anywhere in the Nation, or even the world, in a particular product area. One might even envision many of the current specialized magazine publishers creating affiliated catalogs. This network market

[87] *The New York Times*, Oct. 8, 1987.

[88] At one time it was argued that as many as 50 percent of all office jobs could be performed in the home. See, for example, R.C. Harkness, "Technology Assessment of Telecommunications-Transportation interactions," Stanford Research Institute, Menlo Park, CA, 1977.

[89] For a discussion of recent experience with telework options, see Robert E. Kraut, "Predicting the Use of Technology: The Case of Telework," Robert E. Kraut (cd.), *Technology and the Transformation of White-Collar Work* (Hillsdale, NJ: Lawrence Erlbaum Associates, Inc., 1987), pp. 113-133; and Margrethe H. Olson, "Telework: Practical Experience and Future Prospects," ibid., pp. 135-152. See also Jack M. Nines, "Traffic Reduction by Telecommuting: A Status Review and Selected Bibliography," *Transportation Research*, vol. 22A, No. 4, 1988, pp. 301-317.

[90] Generally speaking, the successful cases were those involving people who either occupied upper-level positions and who traditionally managed their own time, or who were in low-level positions and their work performance could be easily monitored on the basis of output. Kraut, op. cit., footnote 89; Olson, op. cit., footnote 89.

[91] Ibid.

92 "Re~ilers Page Through Videolog Possibilities," Advertising Age, Jan. 18, 1988, special report on direct marketing, p. S13. In early 1988, two firms began pursuing shared use of a videolog, creating CD-ROM disks with up to 50,000 frames/pages of detailed catalog information. The catalogs, which include up to seven detailed photos of items from sellers equivalent in number to one mall, were made accessible to subscribers to the cable systems serving two small communities outside of Boston and Chicago. Both services permit users to instruct the central CD-ROM player to search and retrieve pages/frames by using the telephone. The still photos are distributed to homes via a cable television channel reserved for the service.

[93] Videotex is a general name for a "mass medium which delivers text and visual information directly to consumers. The user interacts with the system via a hand-held keypad, push-button console, or full alphanumeric keyboard. Desired information is retrieved interactively from a videotex center, through telephone lines, via cable, or over a regular television network, with text and graphics displayed on a television screen or other video monitor. While early systems involved terminals, increasing emphasis is being put upon accessing videotex systems with personal computers." As defined by W. Wayne Talarzyk and Murray A. Young, "The New Electronic Media 'Videotex, ' " College of Business, The Ohio State University, RS 88-4, March 1988, p. 252.

concept can also be expanded beyond the realm of easily specified commodities to handle customized requests. For example, networks might be created that allow buyers to specify their needs—verbally or, more likely, in a written form on an electronic bulletin board-so that interested sellers could respond with bids in a kind of reverse auction.

Such systems could also improve buyers' access to evaluation services. The videotex service provided by Prodigy Services Co., for example, facilitates comparative shopping by providing easy access to *Consumer Reports.* As the use of such online catalogs increases, other evaluation services will probably be developed, ranging from those that rate items as acceptable or not to those that go into greater depth, evaluating different aspects of a product.

Notwithstanding these potential benefits, many experiments with videotex have failed, and most Americans remain unfamiliar with its concept.[94] However, this situation may be changing. In a recent survey on consumer awareness of videotex, one-half of the respondents expressed interest in videotex-type services. The results of this survey suggest that:

> ,.. videotex may be in a position similar to where television was following World War 11. Some people have heard about it, a few had experienced it, but almost no one envisioned the impact it would have upon society over the next forty years.[95]

It should be noted that not all aspects of videotex are beneficial from the consumer's point of view. In participating in such systems, consumers make themselves available, in effect, to considerable intrusion on their private lives and increasingly sophisticated marketing devices. As pointed out in a U.S. Federal Trade Commission (FTC) report on videotex technology:

> But the monitoring and control capability also raises substantial and difficult issues of individual privacy. And it places potentially enormous marketing power in the hands of vendors with access to personal or disaggregated information on viewing and purchasing patterns. As a result, will marketers and advertisers be able to manipulate consumers more effectively knowing what their previous purchases have been?
>
> Thus many of the new media, especially those that allow direct sales, raise troubling privacy issues. While some consumers may be willing to sacrifice privacy for the convenience of direct "electronic" ordering, the idea of a central data bank compiling viewing habits, purchasing behavior, and answers to opinion polls for every participating household raises the specter of Big Brother.[96]

By using videotex services consumers may benefit from reduced prices. However, they will also be assuming some of the work that was previously performed by marketers and retailers.

Personal Business

New technology has typically, if not always accurately, been heralded as improving the quality of daily life by eliminating drudgery and enhancing the effectiveness of the individual's efforts. In an age of declining leisure time and increasing demands on that time due to the growing complexity of modern life, some claim that communication technology can make good on this promise by simplifying routine "personal business" activities such as shopping, scheduling, getting information, and personal finance management. Moreover, these technologies may enable people to feel more secure, confident, and in control, and to make better-informed decisions.

One potential the new communication technologies have is to allow individuals to make better use of their time. The videocassette recorder and the automated-teller machine have already introduced individuals to the benefits of "time-shifting' '—doing something at one's convenience that would otherwise be impractical. Now a number of new technologies, such as call-waiting and electronic-messaging, are emerging to enable individuals to better juggle their activities.

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94 Ibid., p. 254.

95 Ibid.

96 U.S. Federal Trade Commission, *Report on the FTC Policy Review Session on New Media* (Washington, DC: U.S. Government Printing Office, *1979),* p. 69, as cited in Vincent Mosco, *Pushbutton Fantasies: Critical Perspectives on Videotex and Information Technology* (Norwood, NJ: Ablex Publishing Corp., 1982), p. 104.

Portable systems such as pagers are also helping individuals to coordinate their activities .97 Hospitals now dispense pagers so that prospective fathers and organ-donor recipients can be "on-call," for example. And Sears, Roebuck's dental care centers provide beepers to walk-in patients so they can browse until a dentist is available. There is a down side to these technologies, however, as anyone who has ever been paged by their boss late at night, or while on vacation, can attest.

We have already discussed how technology can match buyers with sellers. These same technologies may provide a host of other matching services that are useful to the individual. For example, online systems have been designed to facilitate ride-sharing by matching up riders with drivers. Some department stores have computerized their bridal registries so users can view a list of requested marriage gifts and determine which ones have already been purchased by others.[98]

Another time-consuming task that many individuals face is managing personal or family finances. A range of new technologies, from electronic home-banking to electronic-payment systems such as debit cards, promise to speed the completion of these tasks and give the individual more and timelier information about their financial situation. The Internal Revenue Service, for example, is field-testing online tax-filing systems to accompany computerized tax-preparation aids already available from tax-preparation firms or as stand-alone software packages.[99] Benefits to taxpayers could include quicker refunds and earlier warning of arithmetic or other errors.[100]

Another potential for enhancing personal efficiency may be realized by new systems that could improve access to a variety of information, from transportation directions and schedules to answers to questions concerning food preservation.[101] Already, toll-free and so-called "dial-it" [recorded information] telephone lines have revolutionized individual access to such "information on demand. ''102 A list of dial-it numbers available through New York Telephone, for example, includes horoscopes, horserace results, "technical sex tips," Wall Street Reports, grammar tips, and many more topics. *03

Another potential, if controversial, benefit of new communication technology is the security provided by devices that allow people to keep closer watch over one another. Some parents are reportedly giving their children pagers so they can check on them at any time. Elderly citizens already have access to a wide range of monitors and warning devices[104] that sound an alarm at a remote location should help be needed. Some claim these enable them to maintain a less risky independence in their own home. And although, as of 1987, only 3 percent of U.S. residences had monitored alarm systems to warn of fire, vandalism and burglary, and medical emergencies,[105] more effective technologies are emerging all the time.

Concerned that interpersonal relationships will come to be overly dependent on technological mediation, Jacques Ellul calls for a new ethic to deal with the use of technology:

> This new ethic would also be an ethic of freedom. Powerful means do not necessarily insure freedom;

[97] By 1986, there were about 6 million pagers in operation. The most sophisticated were able to display up to 40 letters or numbers, scroll forward and backward, and store up to five messages. Doctors, the first to wear beepers, now represent only one-half of the users. Intercity paging networks have come online, and one can even buy rhinestone-studded beepers as Mother's Day gifts. Peter W. Huber, Antitrust Division, U.S. Department of Justice, "The Geodesic Network: 1987 Report on Competition in the Telephone Industry," January 1987.

[98] John Carey, "Terminals in Public Locations," *Electronic Publishing PIus,* P. 18.

[99] Judy Rosenfeld, "The Electronic Taxman," *PC World,* April 1987.

[100] Lest taxpayers get too enthusiastic, however, the IRS is also testing automatic dialer/recorded message players for calling to chastise delinquent taxpayers early on Saturday mornings.

[101] Which is not t. say that traditional information sources like the newspaper will disappear, quickly or ever. As Huber notes: "A newspaper carries 30 million bits of information, weighs less than three pounds, handles both text and graphics, is completely portable, randomly accessible, 24 hours a day, costs less than 25 cents a connect-hour, and is mostly paid for by somebody else . " Huber, op. cit., foomote 97, p. 22.

[102] Such lines have grown tremendously in recent years, but are not new. As early as the 1930's, lines like dial-it existed for weather and time and Were getting 20,000 and 60,000 calls a day, respectively. Pool, op. cit., footnote 66, p. 121. See also "The Revolution Wrought By Toll-Free Calls," *The New York Times,* Feb. 12, 1987.

103 Huber, op. cit., footnote 97, table PS.1.

[104] Not to mention em$_{ergency}$-care devices. Portable defibrillators can now send status information, such as a electrocardiograms, over telephone lines to a doctor in a hospital. The doctor can then decide if a shock is necessary, and instruct the onsite device to deliver it. "Reach Out and Defibrillate Someone," *The Washington Post,* Health Section, Dec. 8, 1987, p. 5.

[105] Huber, op. cit., footnote 97, p. 13.1.

> on the contrary, technique has come to represent both necessity and fate for modern man, and thus, the effort to recover our ethical identity is the equivalent of resuming the fight for freedom. . . In other words, we must decide that it is not technique that frees us but rather it is from technique that we must free ourselves.[106]

Controlling and Manipulating Technology-Mediated Interactions

New technologies give some individuals more control over who they communicate with, when, and under what circumstances; at the same time, they deprive others of the ability to escape gracefully from unwanted communication or to benefit from anonymity in their communication. People have always taken advantage of their communication systems to exert control over their communication interactions. Some executives use secretaries to screen their calls, for example, and many people use telephone-answering machines for the same purpose. Tomorrow's communication systems will offer more opportunities for such screening and manipulation. By providing advance information about callers, new technologies, for example, allow people to program their telephone to screen out certain callers or to dispense different recorded messages to different callers.[107] Such capabilities will supposedly make communicating more convenient and efficient-for example, by helping to eliminate unwanted communication such as wrong numbers or crank calls. But they will also alter the psychological landscape of interpersonal communication, as have previous innovations.[108]

First, increased control and flexibility may invalidate traditional excuses for avoiding communication. With call-waiting, for example, keeping the line busy is no longer a viable avoidance strategy. In the near future, call-forwarding and portable devices like cellular telephones and laptop computers may make it physically possible for a person to be reached anywhere, anytime.[109] Such developments would make it increasingly difficult for individuals to distance themselves from the demands of others.[110]

Secondly, these capabilities may remove an element of anonymity, and thereby equality of opportunity, from communication. The ability to find out who is calling in advance, as Joshua Meyrowitz, author of No *Sense of Place,* explains, would "re-establish what the phone used to bypass,''[111] perhaps leading to a more formal communication environment where one would have to "present credentials" before being electronically admitted.

> Part of the beauty [of electronically mediated communication] is the anonymity. The phone is an equal opportunity instrument.[112]

For some people, from resourceful reporters to job-hunters,[113] the loss of such anonymity might be a serious problem. One State American Civil Liberties Union (ACLU) director fears that people would stop reporting instances of crime and child abuse if they thought they might be identified.

Whether anonymity or "escapability" will actually be lost, or convenience gained, will depend on what future communication networks are allowed to do. For example, it is unclear whether service

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[106]Jacques Ellul, "The Power of Technique and the Ethics of Non-Power," Kathleen Woodward (cd.), *The Myths of Information: Technology and Postindustrial Culture* (Madison, WI: Coda Press, Inc., 1980), p. 246.

[107]Several regional telephone companies have already begun field-testing such services, which are known generically as "CLASS" (Custom Local Area Signaling Services).

[108]The telephone-answering machine, for example, allows people to "strategically call others when they know they are not home, so they can get credit for calling, but do not have to talk." *The New York Times,* May 13, 1987, p. B1.

[109]Researchers are developing ways for people to "take their phone numbers with them," perhaps by inserting a "smart" plastic card into the nearest telephone wherever they wish to be able to receive calls (in addition to the voice or text messages they maybe able to receive wherever they are). Our culture has been anticipating this development for awhile— remember Maxwell Smart's "shoe phone" on "Get Smart" and Dick Tracy's watch-radio?

[110]Inescapability is not necessarily imposed by technology alone, however. Pool notes that the telephone's ring is "an imperious command" that very few people today can ignore. Pool, op. cit., footnote 66, p. 142.

[111]Personal communication, Nov. 16, 1987.

[112]Ibid.

[113]Some job-hunters are already under pressure to provide more advance information in the form of "video resumes." The tapes, which can cost up to *$300* to produce, are especially important for visually oriented (e.g., artistic) jobs, but are increasingly catching on in other fields. As one employer notes, (WSJ) the tapes are "a quick way of deciding whether [a candidate] met the basic requirements: appearance, command of the language and presentation abilities." Colleges are also beginning to receive the tapes-on average, from 5 percent of their applicant pools. *The New York Times,* Jam *3, 1988.*

providers would be allowed, or even able, to provide the name as well as the number of a caller.[114] Or whether there would be restrictions on subscribers' abilities to trace calls. Is the invasion of privacy an unwanted call, or is it the tracing of that call? And what about unlisted telephone numbers? Many people will not want their communication "address" revealed to others, or to selected types of others. A recent New Jersey field test of a prenotification service prompted complaints from the ACLU and individuals that it compromised the individual privacy of individuals with unlisted numbers.[115] The desire for invisibility may also be selective—a company might want its directory available to clients, for example, but not to headhunters.

Finally, etiquette will play a role in structuring the new communication environment. As technological capabilities change, so may society's perceptions of what is appropriate and acceptable in interactions.[116] We are entering a period of rapid change, with many new capabilities emerging simultaneously, Their design and presentation will likely have a significant impact on how they are used.

Potential for Overcoming Barriers to Physical Mobility

Many people are prevented from participating in society as fully as they would like because of serious barriers to physical mobility. These barriers can be biological—such as physical handicaps and advancing age-or situational, such as difficulty in finding adequate child care, traffic congestion, and lack of time. In an age characterized by impending labor shortages,[117] a growing population of elderly people who may face increasing pressure to continue contributing economically, and more women in the work force, communication technologies that facilitate fuller individual participation will be very important.

Technologies such as the VCR that allow an activity to be rescheduled to a more convenient time have come to be known as "time-shifting" technologies. Systems are emerging that could be called "space-shifting" technologies because they allow individuals to do things in a more convenient place. A videoconferencing system in Brooklyn, New York, for example, designed to streamline the arrest process, allows crime victims and witnesses at the 73rd Precinct station to converse "face-to-face" with prosecutors 5 miles away, in many cases making depositions possible where they otherwise wouldn't be.[118] In Whitman County, WA, a bookmobile equipped with a packet radio[119] offers mobile access to the central library's online card catalog. A cellular telephone hookup in Livonia, MI, allows mobile units to take onsite X-rays for instant analysis at a hospital miles away.[120]

Workers such as writers, data-entry clerks, and engineers are less and less tied to one work location because the technology allows them to transmit textual and graphical information over telephone lines. Even prisoners are using communication systems to participate in the outside world. Inmates of the Stillwater, MN, correctional facility are making telemarketing calls as part of a rehabilitation plan. And inmates of an Arizona women's prison have been taking 800-number telephone reservations for Best Western Hotels for nearly 9 years.[121]

Technologies under development may further sever ties to physical locations. Joint authoring, design, and editing technologies, for example, will make it easier to collaborate with someone who is far away.[122] New call-distribution systems will enable businesses to route overflow call traffic to home-based clerks at their home telephone numbers

[114] If the caller were a friend calling from an unfamiliar number, or a stranger calling from a familiar number, this would obviously not be possible.

[115] According t. Survey Sampling, Inc., Fairfield, CT., one in four Americans has an unlisted telephone number, and unlisting has increased by 25 percent nationwide in the last 4 years. As cited in "Sorry, No Number," *The* New *York Times,* The Editorial Notebook, Dec. 14, 1988, p. A30.

[116] See Judith Martin, "The Telephone at Home," Miss Manners' Guide *to Excruciatingly Correct Behavior (New* York, NY: Warner Books, 1983), pp. 1%-206.

[117] See Terry S. Supple, "The Coming Labor Shortage," *American Demographics*, vol. *8, No. 9, September* 1986, pp. 32-35.

[118] "Picturetel Videoconferencing Systems Help Link police, Prosecutors and Crime Victims in Brooklyn, New York," *Telecom Highlights International,* vol. 8, No. 29, July 22, 1987, p. 13.

[119] Packet radio is a technology for transmitting data Over the airwaves.

[120] Barbara Swaab, "Cellular Speeds X-Ray Diagnosis," *Cellular Business,* July 1986.

[121] "Prison Inmates in Telemarketing *Sales," D&B Reports,* November/December 1986.

[122] See "Proceedings of the First Conference on Computer Supported Cooperative Work," sponsored by the Association for Computing Machinery, 1987.

whenever the in-house clerks are busy.[123] And capabilities such as those provided by CD-ROM (compact disk-read only memory) optical disks that may substitute for the shared support resources of a central office (like libraries or reference materials) could further increase the geographical flexibility of some workers.

Space-shifting systems may enable certain groups-like the elderly—to participate in society longer and more fully than would otherwise be possible. After 2 years, the results of an online program at the University of San Francisco, called SeniorNet, indicate that:

> SeniorNet members began to play more active roles in their communities. Learning computer skills opened up job possibilities for some and helped others relate with computer-using family members. . . [also] by giving them access to technological tools we have the opportunity to share their ideas, learn from their experiences and understand their wisdom.[124]

Space-shifting also benefits individuals suffering from serious health problems. For example, a recent report on corporate strategies for coping with AIDS promoted working at home—technology-assisted if possible-as a way of keeping AIDS victims on the job as long as they are able to work.[125]

But some argue that such systems may only increase feelings of isolation and frustration. Says Erik Sandberg-Diment:

> Most people would probably miss the real world too much, Have you ever asked your computer, "What are you doing after work?",[126]

John Naisbitt, author of Megatrends, agrees:

> The utilization of electronic cottages will be very limited: people want to go to the office; people want to be with people.[127]

Martin Elton wonders whether such arrangements might not in fact become "electronic ghettos," and notes that the results might be mixed, particularly for the elderly.[128] These systems enable them to socialize and participate more without going out, he says, but perhaps the excuse to go out and be with people is what keeps them going.

KEY FACTORS SHAPING IMPLICATIONS FOR THE INDIVIDUAL

How individuals use the new communication technologies and the impacts they have on their lives will depend on a number of factors. This chapter examines three of these:

1. technological literacy factors;
2. socioeconomic factors; and
3. factors relating to system design and support.

Technological Literacy Factors

The issue of literacy has received much attention in recent years, with estimates of rampant illiteracy sparking controversy over the definition of the problem and the nature of possible solutions.[129] Increasingly, the literacy debate is being broadened to include discussions of new communication tools and the skills required to use them. This section will address this issue by focusing on the following questions:

- Do skill requirements constitute a barrier to individuals' use of emerging communication systems?
- What characteristics of the new technologies influence the level of skills required to use them? and
- Should these skills be incorporated into a more general definition of literacy?

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123 Personal communication, Michael Gibbons, Vice President, Bell Communications Research, June 13, 1988.

124 SeniorNet, an online program for seniors, was established in 1986 at the University of San Francisco, supported by the John and Mary Markle Foundation. For a discussion, see Mary Furlong, "On-Line Connection Makes Friends for Seniors," *Media & Values*, No. 45, Winter 1989, p. 11. See also Greg Kearsley and Mary Furlong, *Computers for Kids Over Sixty* (San Diego, CA: Park Row Press, 1988).

125 *The Wall Street Journal*, Jan. 20, 1988.

126 Erik Sandberg-Diment, "Waving to the Future from the Electronic Cottage," *The New York Times*, Jan. 21, 1986, p. 19.

127 John Naisbitt, *Megatrends: Ten New Directions Transforming Our Lives* (New York, NY: Warner Books, Inc., 1982), p. 46.

128 Martin Elton, "When Will the Information Explosion Reach Older Americans?" *American Behavioral Scientist*, vol. 31, No. 5, May/June 1988, pp. 564-575.

129 Estimates of the number of illiterates have ranged from single-digit percentages to one-third of the population. For an overview of the debate, see Charles A. Goodrum and Helen Dalrymple, "Illiteracy in the U.S.," Cole (cd.), op. cit., footnote 58, pp. 40-50.

Many experts, especially in the wake of the proliferation of personal computers, take the position that communication technologies are broadening the range of skills that should be considered necessary to be "literate. ''130 Others claim that, as was the case with the automobile, the need for special expertise in using the new technologies will pass as the devices become more sophisticated.[131] Few dispute, however, that the current generation of communication technology is posing substantial challenges to individuals' learning abilities. From computers to programmable VCRs and answering-machines, to advanced-calling features, the frustrations of figuring out the often complex procedures are widely in evidence.

Corporations have been forced to spend millions of dollars, for example, to teach their employees how to use new private branch exchange (PBX) telephone systems.[132] User groups have sprung up across the country so people can help each other master the nitty-gritty details of computing.[133] As one scholar puts it:

> The home computer is a rather complex product requiring special skills and possibly some training.[134]

Such complexities may discourage potential users. Many people, according to Casimir S. Skrzypczak, Vice-President at Nynex, find the new communication services "too difficult to either learn in the first place or [to] remember. ''135 Jakob Neilsen concurs:

> Just the perception of the necessity of acquiring a huge amount of knowledge to get started keeps many people from trying new systems.[136]

Contributing to this phenomenon is the fact that people may be uncertain about the benefits of the technology in the first place. One Bell Communications Research study of residential users' adoption of new telephone services found that:

> ... in cases where it was clear to users how they could do it and what it would do for them, [the new services] were used. *37

But otherwise they were not.

Even the people who do try out new communication technologies, however, frequently experience frustration. According to recent research, people tend to shy away from investing in the additional learning necessary to take full advantage of the new tools--exhibiting what some researchers call "satisficing" behavior.[138] The pull of familiarity is so strong, in fact, that many people:

> ... prefer to continue to use an older, less powerful software package that they have learned rather than face a new learning curve.[139]

Several hypotheses have been advanced to explain the difficulties individuals are having with emerging communication technologies. Although the research has focused primarily on the computer

130 See, for example, Carolynn Van Dyke, "Taking 'Computer Literacy' Literally, "*Communications of the ACM,* May 1987, vol. *30, No.* 5, Pp. 366-374.

131 The automobiles of the 1920s, for example, required a person t. crank the starter handle and muddle through other technical details. The automobile analogy is often made in the computer industry. Lotus Development Corp. founder Mitchell Kapor, for example, says that most people "don't want to know how it [the computer] works. They want to get it in drive." *The Wall Street Journal,* "Computer Firms Step Up Efforts to Make Machines Easier to Use," Dec. 14, 1987, sec. 2, p. 1.

132 "Modern Telephone End-User Illiteracy Problem Being Confronted," Network *World,* Nov. 17, 1986, p. 23.

133 A recent *New York Times* article on poor productivity in the service industries quoted one analyst as saying: "Many managers and employees still lack the knowledge to use computers and electronic hardware effectively . . . there is a lot of experimentation . . . and a lot of horror stories. " *The* New *York Times,* June 29, 1987.

134 Nicholas P. Vitalari et al., "computing in the Home Shifts in the Time Allocation patterns of Households,' '*Communications of the ACM*, May 1985, vol. 28, No. 5, p. 520.

135 Casimir S. Skrzypczak, "The Intelligent Home of 2010," *IEEE Communications Magazine,* December 1987.

136 Jakob Nielsen et al., "Integrated Software Usage in the Professional Work Environment," Proceedings of the 1986 Conference of the Computer-Human Interaction Special Interest Group of the ACM. Often this perception is reinforced by the size and grammatical obfuscation of the manuals that accompany many new communication tools.

137 Michael A. Gibbons, Assistant Vice President, Bell Communications Research, personal communication, June 13, 1988. Call-waiting, according to one report, has grown twice as fast as any other custom-calling feature because access is completely automatic-customers do not press any buttons to use it. "The Telecom Strategy Letter," Northern Business Information, Inc., 1987.

138 '' Satisficing," a term coined in 1969 by H.R. Simon, is the "satlsfylng of critical requirements just sufficiency to handle the problem at hand without necessarily optimizing the solution." Nielsen, op. cit., footnote 136. In other words, this is getting by any way you can even when you know there must be a better way.

139 Association of Data Processing Organizations, "Report *on* Computer Connectivity," March 1987, p. 15.

because it is programmable, multipurpose, and heterogeneous, the results are relevant to other technologies that may share these characteristics. Some researchers point to the fact that the new systems require more abstract and deductive reasoning than traditional tools such as copying machines or typewriters, which are amenable to simple rule-following.[140] One commentator has compared learning how to use a computer to taking up a musical instrument.[141] Others note that often individuals must modify computer-related tools to fit their particular needs and circumstances-for example, by customizing a word processor's printer driver file to a specific printer, or by designing a database to store specific information. This "reinvention" process, as Everett Rogers calls it, often entails "several weeks of frustrated problem-solving and information seeking after the initial purchase. ''142 Still others point to the diversity of systems as an impediment to communication "literacy," claiming that the multiplicity and inconsistency of command schemes and other procedures confuse individuals and deprive them of synergies in acquiring expertise. Nicholas Vitalari, a professor at the University of California, Irvine, comments:

> Industry cannot expect the average consumer to be fluent in person-machine interfaces of multiple *systems. 143*

It is uncertain whether technological advancements will alleviate the difficulties of operating communication systems, thereby decreasing the need for any special literacy.[144] Technology is emerging to make systems easier to use and understand,[145] but these user-friendly helper programs may sacrifice functionality for simplicity. According to Tom Stewart, they can be "slow, lacking in power and rather rigid in the way they [can] be used."*%

In the meantime, it is clear that skill requirements remain a barrier to individual use of communication tools. What is not clear is the relative importance of, and the distinctions between, different types of new communication skills. As one observer notes:

> Few educators understand which [new technology] subjects fall into which category. . . [and] the general public is even in worse shape in guessing what skills they should learn. *47

Recent definitions of literacy, in the traditional sense, perhaps offer a model for a definition of communication literacy in the emerging technological environment. These definitions have tended to identify a range of skills that comprise literacy, and different levels of those skills that contribute to different levels of literacy. One might be able to read a bus schedule, for example, but not be able to figure out when the next bus is coming. 148 Defining literacy requires determining which skills are necessary, and at what levels of proficiency. To this end, it is necessary to ask questions about specific technologies, while paying attention to their role in society. For example, if a library stops updating its paper card-catalog (as the Library of Congress did in 1986), should literacy include the ability to perform

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[140] At The Women's Computer Literacy Project in San Francisco, computer skills are taught by explaining the whole system in everyday terns, using analogies that reduce technical terms to familiar concepts.

[141] Everett Rogers, *Communication Technology: The New Media in Society (New* York, NY: The Free press, 1986), p. 116.

[142] Ibid.

[143] Nicholas p. Vitalari and Alladi Venkatesh, "In-Home Computing and Information Services," *Telecommunications Policy,* March 1987, p. 70.

[144] Among those who argue that it will are Roger Schank and Peter Childers, *The Cognitive Computer* (Reading, MA: Addison-Wesley, 1984).

[145] An example of such a technology is "Grateful Meal," a system that helps users formulate searches for the database of the National Library of Medicine. Progress is also being made on software to compensate for human inconsistencies in searching and navigating-the tendency to use different synonyms to refer to the same topic on different days, for example. G. W. Furnas, T.K. Landauer, L.M. Gomez, and S.T. Dumais, "The Vocabulary Problem in Human-System Communications," *Communications of the Association for Computing Machinery, vol. 30, No. 11,* November 1987, pp. 964-971.

[146] Tom Stewart, Editorial Opinion, *Behavior and Information Technology,* vol 6, *No-* 2, April/June 1987, p. 95.

[147] Rob Horn, (wanginst!infinet!rhorn on the USENET, a computer mail network). The general confusion over the importance Of computer skills has been evidenced by the ephemeral boom of "computer camps." There were over 500 overnight camps offering computer training as an activity at the phenomenon' speak in the summer of 1984, and about 20 devoted exclusively to teaching computer skills. By 1987, there were fewer than 200 offering any training and only several full-time computer camps. Jim Lemonn, American Camping Association, personal communication, Dec. 10, 1987.

[148] A fairly interesting definition, relevant also because it is nontechnology-specific, is the one recently advanced by the National Assessment of Educational Progress: "using printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential." Irwin S. Kirsch and Ann Jungeblat, "Literacy: Profiles of America's Young Adults," National Assessment of Educational Progress, Princeton, NJ, 1986, p. 3.

an online keyword search? [149] Will literacy in the year 2005 mean the ability to use a spreadsheet? To manage a hard disk? To hook up an old-style 1980s 1200-baud modem and get it running? [150]

Finally, some argue that regardless of the technological environment, literacy will still rest on basic abilities which, by many current accounts, are still severely lacking. According to two writers:

> The information gap is not likely to be solved by easier-to-use interfaces, better ergonomic designs, or artificially intelligent programs. [These systems] require basic reading literacy, knowledge and certain cultural backgrounds, to be used effectively and employed beyond the level of simple entertainment. [151]

The question of promoting literacy in new communication technologies is inextricably intertwined with the question of socioeconomic factors and access to these technologies. But in a society where many will not be able to afford to buy technology for their homes, public-access facilities may be crucial to maintaining certain minimum levels of communication competence. When the telephone emerged in the early 1900s, one of the primary functions of public telephones was to allow people to learn to use them by watching others. [152] Other public-access facilities-from schools to libraries-have traditionally provided a repository for the expertise, in both print and human form, to help people communicate or get information.

A new vision of the public-access facility, to help individuals cope with the complexities of information-age tools, is perhaps in order. In recent years, there have been several noteworthy initiatives. "Hands-on" learning centers-part museum, part classroom, part recreation center—seem to be taking hold across the country. One example is "Playing to Win," a New York City-based nonprofit center, located in the basement of a housing project building, where neighborhood residents can work with and learn about computers. On a larger scale, the Boston Computer Society is planning a $3 million "Computer Discovery Center" to address people's basic questions such as: "What can I do with a computer?" "What do I need to know about computers?" and to "help them feel in control of, rather than controlled by, technology ." [153]

Socioeconomic Factors

The relationship between socioeconomic status and access to communication systems has traditionally been a matter of lively debate and a focus of policy efforts. The concept of universal service, for example, was developed when access to a telephone was deemed vital for an individual to function in society, [154] Since the 1970s, the debate over the link between socioeconomic status and "access" has intensified, with some claiming that there is an increasing stratification of society based on differential access to communication tools and information sources. [155] Others have questioned the validity of these claims, countering that many innovations such as computers and satellites are indirectly benefiting

[149] Or the ability to know when not to use an online system? According to Edmund Pellegrino, it is important for individuals to know "what information [they] want processed, what has been left out, when to ditch the program or the algorithm, and whereto go to read it for [themselves]." Edmund D. Pellegrino, "The Computer and the Book: The Perils of Coexistence," Cole (cd.), op. cit , footnote 58, p. 86.

[150] Carolynn Van Dyke lists the general categories into which most academic researchers currently divide "computer literacy:" familiarity with computers and data processing ("awareness"); ability to use applications programs; ability to program; and knowledge of the ways in which computerized systems are integrated into the social order. These categories may soon begin to divide up mto more categories, as authoring systems become available that will allow people to design and actually construct programs of varying sophistication without understanding the nitty-gritty of computer language semantics and structures. Van Dyke, op. cit., footnote 130, p. 367.

[151] Vitalari and Venkatesh, op. cit., footnote 143, p. 73.

[152] Carey, op. cit., footnote 9& p.13. It sounds silly now, but at the turn of the century, "telephone literacy ''courses were offered commercially. Lloyd Morrisett, in Michael Rice (cd.), "Toward Harnessing New Electronic Technologies to Meet the Needs of Elderly People," report of an Aspen Institute Planning Meeting, 1987.

[153] From the fund-raising literature of the Boston Computer Society. In Sweden, some villages have "tele-cottages" equipped with a variety Of high technology equipment. These provide an information bank and training center; provide services to small businesses; create a network of competence; and create employment in rural areas. Funding comes from county government and municipal boards, and Swedish Telecom. "The Tele-Cottages in the Nordic Countries," *Telecommunication Journal,* vol. *55, No.* V, May 1988, pp. 307-310.

[154] Cross-subsidies and "lifeline" programs have been the chief weapons in the battle to get a telephone in every home, a battle that has not yet been completely won,

[155] These researchers speak of communication gaps between the "information rich" and the "information poor." See, for example, Oscar Gandy, "The Political Economy of Communications Competence," Vincent Mosco (ed.), *The Political Economy of Information* (Madison, WI: University of Wisconsin Press, 1987). See also Cecilie Gaziano, "The Knowledge Gap: An Analytical Review of Media Effects," *Communication Research, vol.* 10. No. 4, October 1983.

the entire population,[156] and that other innovations will follow historical patterns and achieve widespread dissemination after initial adoption by an affluent minority.[157]

From either point of view, questions emerge. How strongly does income correlate with access to communication systems? How is this relationship changing with the emergence of new technologies? Are there classes of technology-empowered individuals, and might new technologies sharpen or blur the divisions between these classes? And, as Ben Compaine asks of the new tools and capabilities:

> What are necessities, what are frills, and what falls in a debatable middle ground?[158]

There has traditionally been some link between communication behavior and socioeconomic status. People without telephone service, for example, have generally been poorer, younger, and less settled than the rest of the population.[159] And people from higher-income households read more books,[160] and could better afford magazines, long-distance calls, and transportation for face-to-face interaction. Nonetheless, the major systems of communication (television, radio, basic telephone service, newspapers, and the postal service) have achieved widespread penetration and use in most strata of society.

Recent technologies, however, have broken this pattern, running into what one observer calls "penetration Walls. "[161] Although these products and services are expected to achieve greater penetration over time, income appears to be a strong factor limiting this penetration. Penetration of videocassette recorders, for example, seems to be reaching a plateau at between 60 and 65 percent. With respect to computers, while 21 percent of all respondents in a survey conducted by AT&T, Consumer Federation of America, and the American Association of Retired Persons said they owned one, the figure was 15 percent for Black respondents, 6 percent for those with incomes below $10,000 a year, and 3 percent for those aged 65 and over. The average member of the Boston Computer Society—at 23,000 members the country's largest computer-users group-earns $50,000 a year, about double the Nation's median annual income.[162]

Part of the reason for this trend may be the increasing range of available services and capabilities, with a corresponding range of prices and fees. In the past, a household either had a telephone or it didn't. Individuals could either get a book or periodical, or they couldn't. They could either send a letter or they couldn't. Today, a telephone subscriber can have touch-tone service, custom-calling services, measured service, wide-area calling, speed-dialing, cellular service, and any number of other features. A bibliographic search can be done in the card catalog-the old-fashioned way-or via one of several different computer databases, containing either citations only or full copy. A text message can be sent via paper mail, electronic mail, facsimile, or overnight courier. In short, the range of communication options is much wider.

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[156] Others cit, examples such as increasing availability of diverse video programming and new calling services as evidence of benefits accruing to a large number of Americans. Call-waiting, for example, offers the same flexibility previously provided by a second telephone line—at a fraction of the cost.

[157] Ben Compaine, "Information Gaps: Myth or Reality," *Telecommunications Policy*, March 1986, p. 11.

[158] Ibid.

[159] Project Summary, Joint Telecommunications Project, Consumer Federation of America, American Association of Retired persons, and AT&T> Feb. 12, 1987, p. 21. The majority of households without telephones had incomes below $10,000 per year. Other studies show that although 92 percent of all households have a telephone, only 81 percent of Black and Hispanic households have one. Entire States fall well below the national average, as do many inner city areas. See also "Low-Income Households in the Post-Divestiture Era: A Study of Telephone Subscribership and Use in Michigan," study prepared by the Michigan Citizens Lobby for the Michigan Divestiture Research Fund, October 1986. These figures are especially significant because studies have shown that people are likely to reduce their spending on medical care and food before they will take a cut in telephone service. "Let's Talk Telephones," Telecommunications Consumer Coalition, 1987, as cited in William Evans, "Towards an Equitable Information Age: Comments and Suggestions Regarding Recent OTA Proposals," Temple University, unpublished paper, Mar. 16, 1987.

[160] Book readership rises progressively with income, from 35 percent of those earning less than $15,000 per year to 70 percent of those making more than $40,000. Cole (cd.), op. cit., footnote 58.

[161] Carey, *op.* cit., footnote 30, p. 7.

[162] Boston Computer Society, and U.S. Bureau of the Census, "Current Population Reports." Such data go on and on. One study found, for example, that penetration of custom-calling services [call-waiting, call-forwarding, and three-way calling] was 34 percent among households with yearly incomes over $50,000, 32 percent in the $35,000 to $50,000 group, and 23 percent in the $25,000 to $35,000 group. "Custom Calling and the Promise of Enhanced Consumer Communications," *Yankeevision*, The Yankee Group, January 1987. For videotex, of the households subscribing to current home systems, the average annual income is estimated to be in excess of $36,000, with one-half of those earning more than $50,000. "Videotex User Survey: 1986," Link Resources, July 1986, p, 1.

Another relevant development is the recent proliferation of different types of communication hardware available for use in the home. Until the 1970s, communication hardware for the home consisted of telephones, radios, and TVs. Today, there is a bewildering variety of hardware-from answering machines to fax machines to digital TVs to modems-that can add hundreds or thousands of dollars to the traditional household communication budget.[163]

It is difficult to determine whether this variety of options and affordability levels will translate into a more communication-stratified society, or what the implications of such a society might be. For know-how and motivation play a large role.[164] People in all income brackets write letters to the editor and call in to talk shows. Moreover, people in all income brackets suffer the frustrations of the new technological environments. For example, an estimated one-third of investment-software buyers eventually scrap their purchases "because the software baffles them. ''[165] And, according to the Joint Telecommunications Project study, people at all income levels had similar perceptions of the difficulty of getting information about equipment repair and local service problems.[166] On the other hand, it is also clear that there is a strong relationship between access to the new technologies and empowerment. A recent study by the National Assessment of Educational Progress, for example, found that "computer competence" among students was linked to having access to a computer in their home, just as traditional literacy has been linked to home-support variables in the past.[167]

In some cases, the difference between access to traditional technologies and access to a new technology is one of convenience. Convenience has always been a basis for price discrimination in communication-if you could afford a book, for example, you could buy it and keep it. Otherwise, you could borrow it from the library and would eventually have to return it. But convenience may take on a different import in the emerging technological environment where ease of use seems to make the difference between use and nonuse.

One concern for policymakers may be to assure that pricing structures and conditions do not exacerbate the problem of stratification of access. In the Joint Project study, three-quarters of those without telephone service said they couldn't afford deposits and other one-time costs of establishing telephone service, while only one-quarter said they could not afford the monthly service charge.[168] The lack of a credit card may be another such barrier, as they are a common prerequisite for subscribing to many online services.

Another concern is that the increased use of emerging communication systems may erode the revenue bases-and therefore raise the costs-of traditional, shared systems such as the U.S. Postal Service, the telephone system, and libraries. Traditionally, these systems exploited economies of scale to make basic communication capabilities and tools widely affordable.

The role of such shared facilities will need to be further examined, and possibly expanded, to consider the provision of affordable access to emerging technologies. Today, individuals who cannot afford a facsimile machine, a computer, or some other type of tool must be able to pay high one-time usage fees for access at commercial outlets ($10 per hour for use of a computer, for example, and $5 per page for facsimile machines). Much debate has centered around the allocation of the costs and benefits of such shared systems, particularly libraries and the telephone networks. Telephone companies, for example, are offering new services (such as custom-calling) for substantial additional fees. Some claim that all ratepayers have subsidized the development of these networks, developing hypothetical "ratepayer equity," and should have equal access to such services without having to pay more.

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[163] Unless external expenditures drop, such as for movies, but this may not be the case.

[164] Conversely, technological know-how does not always translate into socioeconomic success. Jane Uebelhoer of ACORN points out that "a lot of the new dead-end, lower-paying jobs require computer literacy." Personal communication, Dec. 22, 1987. New technology can both reduce and raise the level of skills required to function effectively in various situations.

[165] "Gearing up: More Small Investors Turn to Computers for Assistance," *The Wall Street Journal,* June 25, 1987.

[166] Joint Telecommunications Project, op. Cit., footnote 159.

[167] Michael E. Martinez and Nancy A. Mead, "Computer Competence: The First National Assessment," National Assessment of Educational Progress, Princeton, NJ, April 1988. Even Everett Rogers, who denies that there is any functional need for a computer in the home, says that: "One of the main functions of home computers is to learn how to use a computer." Rogers, op. cit., footnote 141.

[168] Joint Telexcommunications Project, op. cit., footnote 159.

System Design and Support Factors

From the catalogs of the very frost libraries to the switchboard operators of the earliest telephone system, communication systems have always provided guidance and assistance, whether in human or technological form, to their users. Today, the extent and nature of such guidance and assistance is at the crux of many debates over the design of future communication systems, and many feel that the results of these debates will strongly influence the way in which individuals use the technology.

The features in question are the means by which individuals interact with and discover options within their communication and information environment. In technology circles, they are known as "navigational tools" and "interfaces." But most laymen think of them as an unrelated collection of tools and aids—from physical systems like telephone books,[169] TV guides, newspaper headlines, and computer menus, to human helpers like librarians, teachers, and friends. These tools and resources are vital to our ability to communicate. *70

There is much evidence that individuals are not as aware as they might be of their communication options, and that this lack of awareness is a barrier to use of communication systems. In studies of cable TV viewers, for example, researchers have found that viewers are not very aware of the different channels available to them over cable, let alone the different programs.[171] And a big problem in libraries, according to Carol Henderson of the American Library Association, is that people go away thinking "there's nothing there" because they don't know what databases, or sources in general, are available.[172] Indeed, research shows that individuals' communication behavior is very often dictated simply by chance circumstances-viewing "whatever is on" or reading whatever happens to cross their paths.[173]

Not only do people not know what communication options are available, but they often lack crucial information about pricing and conditions of use—a deficiency that can also be a major barrier to use.[174] Since the divestiture of AT&T, consumer advocates have consistently complained about complicated pricing structures, inconsistent pricing, and lack of a standardized source of information about such pricing.[175] Due to competition, there are more services available and more complex pricing schemes to go with them.[176] And information on long-distance rates and calling procedures is no longer included in the one place people typically think to look—the telephone book.

Compounding this lack of awareness of communication options and conditions has been their recent proliferation, dubbed by some as "information overload." The effects of such proliferation, which were first noted in marketing studies of how much product information consumers could digest, are highly disputed. Most agree, however, that by almost any measure the flow of information is quickening. For example, the number of books published annually in the United States increased from 28,600 in 1965 to 51,000 in 1986.[177] As Pool noted:

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169 The telephone book is the most frequently used reference source—21 percent of the population consult it on an average day. The runner-up is material on food preparation, at 18 percent. Neuman, op. cit., footnote 8, p. 8.

170 Mary Culnan, "The Dimensions of Perceived Accessibility to Information: Implications for the Delivery of Information Systems and Services," *Journal of the American Society for Information Science,* September 1985.

171 Carrie Heeter and Bradley Greenberg, "Cable and Program Choice," Zillmann and Bryant, op. cit., footnote 6.

172 & another example of the importance of awareness: when a cable TV experiment went awry in southern Maine last year, a university extension course on firefighting intended for local firehouses was piped instead into ail local residences. The next day, the university was flooded with requests to take the course, and enrollment tripled.

173 Neuman, op. cit., footnote 8, p. 7.

174A good illustration of this is the controversy over price-bundling for pornographic "dial-it" services. Peter Huber notes that when the costs of the pornographic service are billed separately from the costs of the telephone time for these calls-that is, when people can figure out how much is going to the pornography provider and how much to the phone company—use falls off sharply. Huber, op. cit., footnote 97, sec. 8.7,

175 &em&g fear of the complexity of telecommunication rate structures is the main obstacle to getting nonprofit organizations onto computer networks with each other, according to Denise Vesuvio, Executive Director, Public Interest Computer Association, Washington, DC,

176 One recent Study conducted i, Michigan showed that 54 percent of telephone users did not know which type of service they were receiving. Almost 20 percent said they did not know why they chose the type of service they did. Another 20 percent said they chose their service because it was the least expensive. "Low-Income Households in the Post-Divestiture Era: A Study of Telephone Subscribership and Use in Michigan," study prepared by the Michigan Citizens Lobby for the Michigan Divestiture Research Fund, October 1986.

177 Bowker Annual, 1987.

> More and more material exists, but limitations on time and energy are a controlling barrier. .. 178

Daniel Dennett agrees:

> Technology has created innumerable opportunities for us to know, and to act. We want to deal responsibly with this bounty, but we do not know how. When we turn to the question of which priority should engage our best efforts, we drown in the available information, unable to make truly principled decisions.[179]

Computer researcher Thomas Malone recognizes a similar frustration among participants in electronic mail networks who:

> ... often adopt crude methods, such as removing themselves entirely from [electronic mailing] lists that are of occasional interest, in order to avoid being inundated. 180

In this context of information overload and serendipitous communication behavior, minor details in the design of the tools and systems that guide and assist individuals are often the deciding factors in determining communication behavior. The impact of channel selectors, for example, has been shown to be subtle and complex. Researchers have found that subscribers to older cable systems that have two dials (one for the cable and one for the broadcast charnels) generally tend to concentrate their viewing on the channels on either one or the other.[181]

A good example of how design changes can change an individual's communication behavior is the experience of public television. When cable television came along, with its tuner mechanism that encouraged sequential scanning of channels, public television's ratings improved markedly. No longer easily identified with a knob position, the Public Broadcasting Service became just another video channel. 182 In light of the individual's need for more and better assistance in using communication systems, therefore, it is appropriate to consider what the role of policy might be in encouraging systems that provide such assistance. First, however, it is important to realize that, increasingly, the technological tools that provide guidance and assistance are viewed by programming and service providers as a new strategic opportunity to influence individuals. Indeed, there is a very fine line between many access tools—like telephone directories-and advertising. This is especially true in the emerging "online" electronic environment, where the structure and emphasis of access mechanisms like menus and indexes may play a greater role in determining behavior than in traditional media.[183] The implication of this is that any attempt by policy makers to structure such access mechanisms will be inherently controversial.

The promise of the new technology is to provide cheaper, more understandable, and more customized guidance and support to all users of communication systems. New computer-based directories, for example, should be able to present information in different forms to different individuals. Many scholars, who claim that information gaps are largely a result of the way information is presented, see in new technology the potential to help close such gaps.[184] A simple example is that of language barriers. The Hispanic population is growing four times faster than the U.S. population as a whole.[185] But most telephone-based information services (directory assistance, operators, etc.) provide English-only service.[186] The use of dual-language online databases

178 Ithiel de Sola Pool, "Tracking the Flow of Information," *Science, vol.* 221, No. 4611, Aug. 12, 1983, p. 609.

179 Daniel C. Dennett, "Information, Technology and the Virtues of Ignorance, " *Daedalus*, vol. 115, No. 3, summer 1986, p. 148. He continues: "Our responses exhibit a sort of Rorschach magnification of whatever minor personal proclivities emerge from the noise of competing and imponderable alternatives."

180 Thomas W. Malone et al., "Intelligent Information-Sharing Systems," *Communications of the ACM*, vol. 30, No. 5, May 1987, p. 390.

181 Heeter and Greenberg, op. cit., footnote 171.

182 Robert Lippincott, former director of interactive media at WGBH-TV, Boston, MA, personal communication, Apr. 21, 1987. "It [cable] put us on the menu in a way that we were never on the menu before."

183 Independent film producer, Lawrence Daressa, sees new technology as an opportunity to increase public awareness about available programming, particularly educational and informational videos. Daressa, who notes that how program listings "play" is almost as important as the quality of the programs themselves, declares that "government should take a position against couch-potatodom" by subsidizing the marketing of such programming. Personal communication, June 22, 1988.

184 For example, Brenda Dervin, "Categorization of Communication Users," OTA contractor report, September 1987.

185 Joe Schwartz, "Hispanics in the Eighties," *American Demographics*, vol. 10, No. 1, January 1988, p. 43.

186 One company is making pay telephones that, in addition to having an LCD display for operating instructions or advertising messages, have voice-instruction in a choice of languages. *The Star-Ledger,* Trenton, NJ, Feb. 9, 1987.