Volume 38 | Issue 2 Article 3

1993

Law in a Digital World: Computer Networks and Cyberspace

Ethan Katsh

1993]

LAW IN A DIGITAL WORLD: COMPUTER NETWORKS AND CYBERSPACE†

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> "It is generally simpler . . . for people to consider the impact of a ten percent rise in gasoline prices than it is for them to consider the impact of a tenfold increase in the capacity of computer memory chips. Material changes are concrete and imaginable; information changes seem very abstract and mystical."[1]
>
> " 'Tis true, There's magic in the web of it."[2]

"THE law is a seamless web," states an old,[3] oft-repeated,[4] yet difficult to imagine legal maxim. This metaphor suggests that law not only has an intricate structure, but also that all parts of the law fit together smoothly, that each part is linked to

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1. JOSHUA MEYROWITZ, NO SENSE OF PLACE: THE IMPACT OF ELECTRONIC MEDIA ON SOCIAL BEHAVIOR 20 (1985).

2. WILLIAM SHAKESPEARE, OTHELLO, act 3, sc. 4, line 69 (George L. Kittredge ed., Ginn 1941) (1621).

3. There is considerable ambiguity about the origin of this expression. Frederic Maitland, an English legal historian, appears to have been the first to use the phrase "seamless web" in a law-related context. Maitland wrote: "Such is the unity of all history that any one who endeavours to tell a piece of it must feel that his first sentence tears a seamless web." Frederic William Maitland, *A Prologue to a History of English Law*, 14 L. QUARTERLY REV. 13 (1898); *see also* 1 Frederick Pollock & Frederic W. Maitland, THE HISTORY OF ENGLISH LAW 1 (2d ed. 1899).

4. A search of LEXIS' MEGA file showed 163 references to a "seamless web." Search of LEXIS, MEGA library, MEGA file (Feb 10, 1993).

every other part and that the whole arrangement grows and evolves according to plan. More specifically, the seamless web metaphor implies that "the common law could be logically explained and was a part of a greater system"[5] and that "every new decision affects, at least minimally, every legal proposition."[6] This impressively designed process is embodied in the somewhat similar, albeit more eloquent, words of Oliver Wendell Holmes, whose vision of law was expressed as follows:

> When I think thus of the law, I see a princess mightier than she who once wrought at Bayeux, eternally weaving into her web dim figures of the ever-lengthening past—figures too dim to be noticed by the idle, too symbolic to be interpreted except by her pupils, but to the discerning eye disclosing every painful step and every world-shaking contest by which mankind has worked and fought its way from savage isolation to organic social life.[7]

For most lawyers, judges and citizens, law without contradictions and inconsistencies today is as difficult to imagine as is a seamless web. Although law undoubtedly retains some web-like qualities, the modern legal web also appears to contain many loose ends, to be stretched beyond capacity and to have seams that show very clearly. Gaps in the law are increasingly obvious, and division and specialization, more than unity and generalization, characterize much of legal practice and the law. As Professor Harold Berman has noted, "[t]he law is becoming more fragmented, more subjective, geared more to expediency and less to morality, concerned more with immediate consequences and less with consistency or continuity."[8] Or, as Professor Robert Berring has claimed, "there is no 'brooding omnipresence in the sky.' The old system of grand structure is gone."[9] Indeed, more than one judge has declared that "[r]ather than a seamless web . . . [the law is] a patchwork quilt."[10]

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5. Robert C. Berring, *Legal Research and Legal Concepts: Where Form Molds Substance*, 75 CAL. L. REV. 15, 16 (1987).

6. Kenneth J. Kress, *Legal Reasoning and Coherence Theories: Dworkin's Rights Thesis, Retroactivity, and the Linear Order of Decisions*, 72 CAL. L. REV. 369, 389 (1984).

7. Oliver W. Holmes, *The Law*, *in* SPEECHES 17-18 (1918).

8. HAROLD J. BERMAN, LAW AND REVOLUTION 39 (1983).

9. Berring, *supra* note 5, at 26.

10. Blessing v. United States, 447 F. Supp. 1160, 1167 (1978) (examining questions of whether discretionary exception to federal liability in tort is juris-

One way to interpret this loss of faith in the seamless web metaphor is to view it as reflecting a new realism and a greater understanding of the nature of law. The metaphor may never have represented law as it actually existed but, rather, was a myth or symbol and an idealization of our hopes for law.[11] In this sense, the purpose of the metaphor was to emphasize and promote a belief in the law's consistency, integrity and coherency.[12] The metaphor was a symbolic attempt to promote the law's legitimacy and to bring order to the law. The development of the metaphor parallelled the attempts of scholars, from Blackstone to the present day, to portray the law as possessing an all-encompassing structure, to identify links between apparently inconsistent judicial decisions and to demonstrate that natural connections can be found in seemingly disparate parts of the law.

An alternative interpretation exists, however, as to why the seamless web metaphor may have lost much of its appeal. This interpretation looks behind the actual qualities of the law to the manner in which these qualities are communicated. This perspective suggests that myths and other strongly held beliefs about law are dependent upon, linked to, and supported by the communications process. The seamless web, therefore, is not a reference to the process and practice of law as much as it is a characterization of a preserved and organized body of law, one contained and embedded in the centuries old technology of print. It is a label, a metaphor for an institution whose reflection has been seen for centuries in books and in the domain of print. If, therefore, this characterization of law seems not as compelling today as it once was, it may be because the communications process that underlies the metaphor is shifting. Thus, while it is possible that loss of faith in the metaphor may simply signify the long overdue de-

dictional or governmental defense and finding that prior judicial opinions did not offer much guidance or direction).

11. Persuasion is one of the functions of metaphor. *See* GEORGE LAKOFF & MARK JOHNSON, METAPHORS WE LIVE BY 139 (1980) ("[M]etaphors are capable of giving us a new understanding of our experience. Thus, they can give new meaning to our pasts, to our daily activity, and to what we know and believe.")

12. For a discussion of the role and uses of metaphor in law, see JAMES B. WHITE, THE LEGAL IMAGINATION 57-64 (1973) ("As [the lawyer] works on an antitrust case or a criminal appeal, the lawyer may say to himself that what he is doing and saying really means something else. . . . The activity of law can be spoken in other terms."); *see also* MILNER S. BALL, LYING DOWN TOGETHER: LAW, METAPHOR AND THEOLOGY 21-36 (1985) (suggesting that current metaphor of law as bulwark of freedom promotes order rather than justice and that new conceptual metaphor is needed to open dam and to allow circulation, connection and progress); LON. L. FULLER, LEGAL FICTIONS (1967).

struction of a myth, it is also possible to view it as movement away from print based representations of law and as a growing inability to have faith in a model of law that could only exist in printed form.

This Article suggests that in order to understand deep rooted changes in how law is perceived and how it works, it is necessary to look at the changes occurring in how we communicate and how we work with information. Law is, and always has been, embodied in some medium of communication.[13] The methods, institutions and doctrines of law, as well as its metaphors and figures of speech, have always reflected and in some way have been linked to the qualities, constraints and opportunities of these media.

The shift from print to electronic information technologies provides the law with a new environment, one that is less fixed, less structured, less stable and, consequently, more versatile and volatile. Law is a process that is oriented around working with information. As new modes of working with information emerge, the law cannot be expected to function or to be viewed in the same manner as it was in an era in which print was the primary communications medium. Nor can the law be expected to support the same symbols and metaphors. Not only the seamless web, but "fine print," "black letter law," "law on the books" "going by the book," and other print based expressions will be replaced by allusions that are more consistent with the qualities of law and information in electronic form.[14]

The shift from print to electronic technologies involves a series of changes in how information is transmitted, used, stored

13. *See generally* M. ETHAN KATSH, THE ELECTRONIC MEDIA AND THE TRANSFORMATION OF LAW (1989) (positing that law and communication are inextricably related and examining how developments in storing, processing and communicating information are bringing about resulting changes in law).

14. *See* BALL, *supra* note 12, at 232. Ball has pointed out that current legal metaphors may be based on earlier forms of communication. He suggests:

> The conceptual system of law as the rampart of civilization is at least partially reinforced by a metonymy, the identification of or reference to law by the early means of its recordation and communication: the two tablets of stone which Moses bore to the Israelites, for example, or the stele, an eight-foot diorite shaft, on which the Code of Hammurabi was inscribed. The jurisprudence of the past has attributes of a quarry.

Id. at 23 n.12.

As the predominant form of communication shifts from print to electronic, away from printed volumes of statutes, regulations and court opinions and even further away from carvings on stone, legal metaphors will also change to reflect the changes in communication. *Id.* at 112.

and presented.[15] Increasing numbers of legal professionals are already familiar with the use of computers for manipulating and for processing information.[16] Except for WESTLAW and LEXIS, however, fewer professionals are probably familiar with the communicative capabilities of computers such as electronic data networks and other new ways of acquiring and transmitting information at a distance.

We are currently in a period of transition. More and more people are becoming aware that the computer is an extraordinary communicative device, are learning how to send and receive information via their computers and are gaining access to computer based telecommunication networks. As this transition continues, we will not only develop a new understanding of the novel and powerful modes of distributing information electronically, but we will also realize more clearly that this powerful new medium of communication has significant implications for law as well as for many other societal institutions.

There is, quite understandably, some resistance to trying to understand communications-related change by focussing on media, the means by which information is conveyed, rather than on the information itself. This reaction is not unprecedented, however, particularly during the early phase of the development of some new technology, when differences in the manner in which some task is conducted are not necessarily easy to recognize and when, as a result, the qualitative differences between the old and the new technologies tend to be neglected. It was such myopia that caused early automobiles to be labeled "horseless carriages," rather than to be recognized as a means of transportation that changed the larger environment. It was such myopia that caused early films to be labeled "moving pictures," rather than to be recognized as a new art form. In the early days of printing, such an outlook led some powerful institutions to welcome printing en-

15. While this Article focuses on electronic networks and the differences between print and electronic communication, it should be noted that this represents only part of the shift that is currently taking place. The use of electronic information technologies provides new opportunities for processing and presenting information, most notably the use of hypertext, graphics and artificial intelligence. The relationship between these techniques and the law is explored in a larger work. *See* M. ETHAN KATSH, LAW IN A DIGITAL WORLD (forthcoming 1994).

16. *See* RONALD W. STAUDT & JAMES I. KEANE, LITIGATION SUPPORT SYSTEMS: AN ATTORNEY'S GUIDE §§ 1.10-1.13, at 9-13 (2d ed. 1992). In 1991, 61% of the lawyers in the 500 largest law firms in the United States had a computer workstation on or near their desks. Five years before, in 1986, the percentage was 7%. *Id.* § 1.13, at 13.

thusiastically; they assumed that printing was merely a powerful replacement for writing. These institutions failed to understand, however, that printing could not be controlled as easily as writing had been and they did not recognize that printing also changed the larger environment.[17]

More recently, we have labeled the devices that transform electrical impulses into words on paper as "printers," and electronic databases as "libraries." These characterizations, representing obvious frames of reference from the print era, are understandable attempts to place new modes of processing and interacting with information in a familiar framework and to make users feel comfortable with the new technologies. Although these characterizations or metaphors may seem to make sense today, they are patently inadequate. The library metaphor,[18] for example, is like the "horseless carriage" expression, in that it fails to explain the novel and powerful ways in which the new technology

17. *See* 1 ELIZABETH EISENSTEIN, THE PRINTING PRESS AS AN AGENT OF CHANGE 303-13 (1979). In her classic study of the impact of printing, Elizabeth Eisenstein noted that Church officials hailed printing as a "divine art" and as being "divinely inspired." *Id.* at 317. Yet, as printing was employed in novel ways and as it became a mass medium, individuals became empowered and were able to challenge the Church in ways that had not been possible in earlier periods. The Reformation was "a movement that was shaped at the very outset (and in large part ushered in) by the new powers of the press." *Id.* at 303. Thus, in 1519, when Martin Luther tacked his complaints about the Catholic Church to the church door in Wittenberg, Germany, the Ninety Five Theses were also printed and circulated widely. *Id.* at 306. Eisenstein wrote:

> When Luther proposed debate over his Ninety-Five Theses, his action was not in and of itself revolutionary. It was entirely conventional for professors of theology to hold disputations over an issue such as indulgences and 'church doors were the customary place for medieval publicity.' But these particular theses did not stay tacked to the church door (if indeed they were ever really placed there). To a sixteenth century Lutheran chronicler, 'it almost appeared as if the angels themselves had been their messengers and brought them before the eyes of all the people.' Luther himself expressed puzzlement, when addressing Pope Leo X six months after the initial event: It is a mystery to me how my theses, more so than my other writings, indeed those of other professors, were spread to so many places. They were meant exclusively for our academic circle here.

Id. (footnotes omitted).

18. When used in reference to an electronic database, the word "library" may seem to some readers to be an appropriate use of the word. My view is that there are such considerable differences between print libraries and electronic sources of information that the use of the word to describe both sources of information hinders our understanding of these differences and, indeed, prevents many users from adapting to the novel features of the electronic environment. If it is thought that it might be helpful to use the word "library" in some electronic contexts, therefore, it should be made clear that it is only being used as metaphor, as an allusion to something familiar.

differs from the old and gives no hint of the new directions in which the new technologies are leading us. Some day in the future, the "library" label may seem as imprecise and nearsighted as "horseless carriage" does today.

The legal profession is not alone in trying to understand how the movement of information in new ways affects its methods and missions as well as its visible products. Scientists, for example, recognize that powerful numerical and statistical tools not only facilitate and expand the ability to calculate but also change what science is.[19] Similarly, artists understand that graphical tools affect not only the ability to draw pictures but also to change styles and concepts of art. This is understandable if one realizes that "[l]anguage, mathematics, law, religion, philosophy, arts, the sciences, and institutions of all kinds, . . . are edifices of a sort, like the libraries we build, physically, to store their operating instructions, their 'programs.' "[20] The underlying theme of this Article is that new tools for communicating and for working with information, particularly new tools that expand our ability to communicate information over great distances, not only affect our ability to express ourselves, but ultimately bring about changes in what law is and does.

At the end of the current transitional period, print will not vanish but it will play a substantially different role. At some point, it will cease to dominate the legal landscape as it has for the past several centuries.[21] Paper and print will continue to be pres-

19. *See* WILLIAM J. KAUFFMANN & LARRY L. SMARR, SUPERCOMPUTING AND THE TRANSFORMATION OF SCIENCE 118-223 (1993) (discussing how supercomputers have affected and transformed fields of biology, engineering and ecology); *see also* James R. Beninger, *Information Society and Global Science*," 495 THE ANNALS OF THE AMERICAN ACADEMY OF POLITICAL AND SOCIAL SCIENCE 14, 20 (1988) ("Through digitalization and telematics, currently scattered information—in diverse forms—will be progressively transformed into a generalized medium for processing and exchange by a global system. . . . We might expect the implications to be as profound for a global science as the institution of money was for world trade."). For an excellent perspective on the relationship of science and forms of communication, see JOHN M. ZIMAN, PUBLIC KNOWLEDGE: AN ESSAY CONCERNING THE SOCIAL DIMENSION OF SCIENCE ix (1968) (examining how scientists "teach, communicate with, promote, criticize, honour, give ear to, give patronage" to each other and to the scientific community).

20. *See* Michael Benedikt, *Introduction*, *in* CYBERSPACE: FIRST STEPS 4 (Michael Benedikt ed., 1991).

21. *See* Ronald K.L. Collins & David M. Skover, *Paratexts*, 44 STAN. L. REV. 509 (1992). Collins and Skover note that:

> Approximately a century after the invention of moveable type, Western legal tradition began to be characterized by print. Today, our legal consciousness is still demarcated and mediated by printed texts. Whether, for example, in the formation and interpretation of wills or

ent in our environment, but we will work more frequently with information in electronic, rather than print, form. More importantly, we will begin to attribute to the electronic medium the attention and status reserved for the culture's primary medium. As Michael Benedikt has observed, "just as printing did not replace but displaced writing, and writing did not replace but displaced storytelling, and just as movies did not replace theater nor television movies . . . cyberspace will not replace either objective reality or dreaming or thinking in their historical modes."[22] Thus, words on paper will remain commonplace, but the principal manner in which we think about, describe and use information will be based on electronic models of how information is organized, stored and processed.

The new media can be considered to be "displacing" because they not only make available some new tools for working with information but, in a sense, create a new environment. Displacement seems an appropriate term for what is occurring because these changes put us in a different space from where we were. The new media do not, of course, physically move us, as did the changes in spatial orientation brought about by the automobile and other modern modes of transportation, but rather they cause us to interact with our surroundings differently. The new media change options and opportunities and provide us with an environment where new relationships with people and groups are fostered, and where new relationships begin to occur between people and institutions.

This new environment emerges, in part, because the movement of electronic information is governed by quite a different set of rules than existed in the print environment. Just as the automobile created an environment in which rules for transportation were novel and unprecedented, the electronic media seem to exist in a context or space where they do not have to play by the same rules as print and, therefore, are not subject to the same constraints as print. This electronic space can be envisioned as an almost magical place, in the sense that various physical laws that restrict movement and limit capabilities have been lifted. The theme of displacement—of being put in a new space—is useful,

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contracts, or in the review of court trials and legislative proceedings, the law's primary instrument remains the printed document. Wherever we turn, legal reality is shaped largely by the printed word.

Id. at 509-10.

22. Michael Benedikt, *Cyberspace: Some Proposals*, *in* CYBERSPACE: FIRST STEPS 124 (Michael Benedikt ed., 1991).

therefore, because it focuses on context rather than content. As a result, it can serve to shift attention to *how* we use and communicate information and away from *what* the information is. This focus will, I hope, assist in explaining both how the new media are different and why change is occurring as a result of this.

We are only in the beginning phases of developing the electronic environment or space. Movement in this direction will accelerate as more persons acquire the ability to send and to receive information in electronic form and as high speed electronic networks for communicating information are put in place. For those individuals who currently limit their use of the computer to processing words and numbers, the addition of communicative capabilities represents the next frontier in mastering the electronic technology. Many lawyers are, of course, familiar with LEXIS and WESTLAW, but the electronic communicative environment that is on the horizon involves something much broader and more flexible than what occurs when one extracts information from a large and distant database. It involves, for example, a much more extensive and developed network. It involves understanding how persons far away can work on data in your possession, how you can work on data in their possession and how you can work together on the same data at the same time. It also involves greater use of non-textual forms of expression, such as images, graphs and charts.[23] It involves new forms of text, such as hypertext,[24] and new ways of interacting with machines en-

23. The first decade of personal computers, for most individuals in the non-Macintosh world, was spent looking at words and numbers and not images. As computers have become more powerful, it has become possible to allow images to appear on screen without slowing down the machine too much and graphical interfaces have, therefore, become much more popular than they had been previously. Computers will not become television but there are enormous opportunities for expression and communication that are restricted when one can only employ words and numbers.

24. *See* GEORGE LANDOW, HYPERTEXT 4 (1992). Hypertext is "nonsequential writing—text that branches and allows choices to the reader, best read at an interactive screen," and as commonly used, refers to "series of text chunks connected by links which offer the reader different pathways." THEODOR H. NELSON, LITERARY MACHINES 2 (1981); *see also* JAY D. BOLTER, WRITING SPACE: THE COMPUTER, HYPERTEXT, AND THE HISTORY OF WRITING 24 (1991) ("[T]he connections of a hypertext are organized into paths that make operational sense to author and reader. In print, only a few paths can be suggested or followed. In an electronic version, the texture of the text becomes thicker, and its paths can serve many functions."); Trotter Hardy, *Project CLEAR's Paper Choice: A Hypertext System for Giving Advice About Legal Research,* 82 LAW LIB. J. 209, 211 (1990) ("The advantage of this [hypertext] information structure over others is both the speed of access and the fact that users can display and read only those topics they want, without having to bother with other topics."); David R. Johnson, *Building and Using Hypertext Systems,* 17 LAW PRACTICE MANAGEMENT, May-June, 1991 at 28, 30

dowed with artificial intelligence.[25] It involves appreciating how the tools for working with and distributing electronic data are far more efficient and quite different from tools for working with words on paper. It may even involve acquiring a preference for seeing something on the screen rather on the printed page, something that at the moment seems improbable.

In order to explain this process, I shall try to describe the operation of the new technologies in spatial terms and try to relate them to the law's informational environment. At least two benefits can be derived from looking at the new media in spatial terms. First, such an approach enables us to understand not only the occurrence of discrete changes in how information is being used and processed, but also the direction these changes are leading both the institution and practice of law. An environmental or spatial framework allows one to see activities not in isolation but in terms of how they are linked to changes in other parts of the institution. A new environment not only brings about changes in specific behavior, but also changes in positions, interests, expectations, relationships and attitudes. Using an environmental or spatial perspective enables us to understand not only what is replaced but what is displaced—not only what continues in essentially the same form (or disappears) but what is altered and reshaped.

The second reason why it is appropriate to look at the new communications technologies as affecting the law's information environment or space is that much of what any medium of com-

(suggesting that hypertext is particularly suited for legal practice because it allows lawyers to retrieve and analyze quickly, to build network of relevant materials and to store unlimited detail "without burdening the user of the system with the need to look at this data unless and until it is needed"); Ronald W. Staudt, *Legal Mindstorms: Lawyers, Computers and Powerful Ideas*, 31 JURIMETRICS J. 171, 184 (1991) (positing that hypertext would help to teach law students to think like lawyers by helping them to "organize, link, synthesize, identify relationships, and learn legal concepts").

25. RICHARD E. SUSSKIND, EXPERT SYSTEMS IN LAW 8-18 (1987) (suggesting that use of expert systems in law will provide members of legal profession with knowledge and interpretation of law rather than mere data and documents and will reduce dependence on experts in specialized areas of law); Edwina L. Rissland, *Artificial Intelligence and Law: Stepping Stones to a Model of Legal Reasoning*, 99 YALE L.J. 1957 (1990) (commenting that although law is challenging field for artificial intelligence use because it often does not have clear cut answers and because it is always changing, legal profession can still take advantage of artificial intelligence to "explicate the process of legal reasoning, for instance the creation of case-based arguments; to shed light on questions of legal philosophy, such as the nature of open-textured predicates; and to provide practical, even socially beneficial applications, such as expert systems in certain administrative areas").

munication does is explainable in spatial terms. Communication in writing and print, indeed communication via any form other than the spoken word, is an attempt to overcome barriers caused by the spatial separation of two or more individuals.[26] At the heart of the new media are capabilities for working with space in novel ways and for overcoming constraints that are assumed to be fixed, but, in reality, are only constraints imposed by limitations of print and writing. As will be explained below, the electronic media bring change because they, unlike print, are seemingly unconstrained by a variety of physical forces and can create a space where Newtonian laws seem to be circumvented. The following discussion begins, therefore, with a description of some of the ways that the new media are beginning to provide us with a new kind of space, one which is much less subject to the physical constraints that operate in the print environment. Following this, I

26. The late Canadian economist Harold Innis provided the earliest, and perhaps still the most innovative examination of the role of media in affecting time and space. *See* HAROLD A. INNIS, EMPIRE AND COMMUNICATIONS (1950) (using notion of empire as measure of efficiency of media and suggesting that empires flourish by not overemphasizing singular medium but by employing both media influencing time and decentralization, such as parchment, clay and stone as well as media influencing space and centralization, such as papyrus and paper). Innis has noted:

> A medium of communication has an important influence on the dissemination of knowledge over space and over time and it becomes necessary to study its characteristics in order to appraise its influence in its cultural setting. According to its characteristics it may be better suited to the dissemination of knowledge over time than space, particularly if the medium is heavy and durable and not suited to transportation, or to the dissemination of knowledge over space than over time, particularly if the medium is light and easily transported.

Id. at 33; *see also* HAROLD A. INNIS, THE BIAS OF COMMUNICATIONS 33-60 (1951). Marshall McLuhan later developed a famous spatial metaphor for understanding the interaction of media and space. In explaining his global village metaphor, McLuhan stated that "[p]ostliterate man's electronic media contract the world to a village or tribe where everything happens to everyone at the same time." *See* EXPLORATIONS IN COMMUNICATION ix (Edmund Carpenter & Marshall McLuhan eds., 1960); MARSHALL MCLUHAN & QUENTIN FIORE, WAR AND PEACE IN THE GLOBAL VILLAGE 17 (1968) ("The electronic culture of the global village confronts us with a situation in which entire societies inter-communicate by a sort of 'macroscopic gesticulation' which is no speech at all in the ordinary way."). For an interesting recent examination of media in spatial terms, see BOLTER, *supra* note 24, at 15-31. In considering how the computer creates a new space for information, Bolter focuses on hypertext and emphasizes a less metaphorical view of electronic space. He explains:

> By "writing space," I mean first of all the physical and visual field defined by a particular technology of writing. All forms of writing are spatial, for we can only see and understand written signs as extended in a space of at least two dimensions. Each technology gives us a different space.

Id. at 11.

discuss two key facets of our orientation with space that are being changed by the new media. In the last section, I suggest a model for looking at law in spatial or environmental terms and, using the law library as an example, examine several ways in which the electronic medium's novel spatial capabilities can affect the legal environment.

I. THE TECHNOLOGICAL WEB

Cyberspace is a concept that I associate with a mature electronic culture.[27] Such a culture not only allows one to process and work with information in electronic form, but it also presents sophisticated electronic means for acquiring and for distributing information. It relies on powerful computers to store and to analyze data and links these computers together to share data and communicate with each other. Cyberspace emphasizes the network that links computers and supports communication that occurs so quickly that it removes spatial distance as a constraint in obtaining information and even in working with people. It focuses more on the network as a whole than on any particular computer that is tied to the network. It is, therefore, something that is much broader than LEXIS or WESTLAW or any other single large source of electronic information. It suggests an environment where novel electronic interactions foster new relationships with people and information and where communication occurs so quickly and over such great distances that many basic assumptions of institutional life are challenged. In its most controversial

27. WILLIAM GIBSON, NEUROMANCER 51 (1984). Gibson, a science fiction writer, coined the term Cyberspace in his 1984 novel, writing:

> Cyberspace. A consensual hallucination experienced daily by billions of legitimate operators, in every nation . . . . A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding. . . .

Id.

For a discussion of cultural values implicit in "cyberpunk" literature, see ANDREW ROSS, STRANGE WEATHER: CULTURE, SCIENCE, AND TECHNOLOGY IN THE AGE OF LIMITS 152 (1991) (positing that white masculinism shaped cyberpunk's counterpolitics to "the magnification of the two-tier society, the technocolonization of the body, the escalation of the pace of ecological collapse, and the erosion of civil society, public space, popular democracy, and the labor movement" and virtually ignored "feminism, ecology, peace, sexual liberation, and civil rights"); Paul Saffo, *Consensual Realities in Cyberspace*, *in* COMPUTERS UNDER ATTACK: INTRUDERS, WORMS, AND VIRUSES 416-20 (Peter Denning ed., 1990). ("More often than we realize, reality conspires to imitate art. In the case of the computer virus reality, the art is 'cyberpunk,' a strangely compelling genre of science fiction that has gained a cult following among hackers operating on both sides of the law.").

characterization, Cyberspace assumes that the removal of spatial barriers combined with the high level of online interaction creates a feeling among those electronically connected that they are indeed in the same place even though they are physically separated by great distances.[28]

Even if one finds vagueness in this description of Cyberspace, and even if one is unable to accept all of the various meanings of the word, I find it a useful term because it helps to place a clear focus on the communicative powers of computers and on the manner in which changes occur in how space and distance are used and perceived. It is also a term that accepts implicitly the idea that new media bring about new environments and it recognizes that networks have an impact that goes beyond their normally perceived function of transmitting data at unmatched speeds. It is, finally, a term that may assist us in understanding that individuals encountering cyberspace encounter many of the same challenges that face anyone placed in any new and unfamiliar environment.

As we begin to understand the nature of these networks and the differences between electronic and print forms of communication, and as we strive to come to terms with a model of law that lacks the features of a seamless web, we are immediately faced with an obvious irony. The irony is that the communications networks that are rapidly being put into place are themselves increasingly being referred to as a web.[29] Thus, at the same time that the "seamless web" has been losing its power as a useful legal metaphor, our telecommunications system has been acquiring many of the markings of the spider's creation. Computer scientist Vinton Cerf has written: "A web of glass spans the globe. Through it,

28. *See generally* DAVID GELERNTER, MIRROR WORLDS (1991); MYRON KRUEGER, ARTIFICIAL REALITY II (1991); HOWARD RHEINGOLD, VIRTUAL REALITY 116 (1991) (noting that "[a]t the center of every [virtual realty] system is a human experience the experience of being in an unnatural or remote world"); BENJAMIN WOOLEY, VIRTUAL WORLDS (1992).

29. *See, e.g.*, THE INFORMATION WEB (Carol C. Gould ed., 1989). The most recent "web" phenomenon is the World-Wide Web, software that exists on the Internet to link a person to sources of information on many other computers around the world. A law oriented use of this "seamless web" software can be found on the Cornell Law School Legal Information Institute computer. Anyone with an Internet address can access this computer by typing the following at the local prompt: Telnet fatty.law.cornell.edu. After the connection is made, the system will ask the user for his or her name. If the user then types the word GOPHER and presses ENTER, a menu with many options for accessing other Internet computers will appear on the screen. The notation WWW will indicate which of the menu choices employ the World-Wide Web software. The Cornell computer can also be accessed via local gopher programs.

brief sparks of light incessantly fly, linking machines chip to chip and people face to face."[30]

This technological web, at least when it is fully formed, will touch every medium and form of communication and, as a consequence, every institution. Parts of the web already allow the spoken word, as it moves over telephone lines, to travel across the globe as easily as it travels across the street. It currently permits the written word to be transmitted easily as a fax or, with somewhat more difficulty, as an e-mail message. These components are elementary compared to what will become available, but they can serve as a reference point for beginning to understand the more powerful network that is gradually being put in place to transmit words, numbers, images, sounds and any combination of modes of expression.

Prior to the development of electronic forms of communication, every medium was largely independent of every other medium. Speech, writing and print each had their special strengths and weaknesses but translating information from one medium into another medium was typically a cumbersome process. Even as recently as two decades ago, print was something largely untouched by electronic forms of communication, broadcasting was distinct from cable television, and television differed from computerized communications. Each form of communication generally existed as a separate industry. The "seams" separating these and other forms of communication from each other, in other words, appeared to be natural and were even recognized by law.[31]

30. *See* Vinton G. Cerf, *Networks*, SCIENTIFIC AM., Sept., 1991, at 72.

31. *See* Pamela Samuelson, *Digital Media and the Law*, COMM. OF THE ACM, Oct. 1991, at 23. Samuelson has noted that:

> Copyright law has traditionally treated different kinds of copyrighted works differently. Some kinds of works, for example, do not have the same sets of exclusive rights as do other works. Some special privileges to copy or make certain uses of copyrighted works are available to certain classes of copyrighted works, but not to others.
>
> While there are some historical and public policy reasons for making such distinctions among different classes of works, there are additional important reasons for these distinctions: They reflect differences in the media by which different works have traditionally been made available to the public, as well as the technologies by which the different media are created and the distribution channels by which different media are disseminated to their respective publics. Books, the quintessential work of the print media, are made by printing presses, bound, and sold largely in bookstores. Paintings, sculpture, and photography are quite different media from books, and tend to be produced and distributed in quite a different manner as well. Phonograph records and compact discs are mechanically impressed with encoded information which, when played on a machine, can bring musical performances

As almost every form of communication becomes electronic, however, many of the boundaries between media are more difficult to see.[32] What had traditionally been a system of different and distinct media is evolving toward a state of seamlessness and common qualities.[33]

There are, of course, many bottlenecks or seams remaining in our communications system. It is still not nearly as easy to send electronic data from one person to another as it is to pick up the telephone and speak to that person. Sending data requires a computer, a modem, communications software, a link to a communications network, and the electronic address of the person you wish to communicate with. In addition, it is important to un-

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into one's home. While motion pictures also require a machine to be revealed, they differ significantly as a medium from sound recordings. Yet, they are similar in that they are often broadcast by radio waves, yet another medium whose differences from the printed medium were chronicled by Marshall McLuhan, among others. The point here is that copyright has traditionally conceptualized each entity as being only what it is, and not another thing.

Id. at 26.

32. *See* JAMES R. BENIGER, THE CONTROL REVOLUTION: TECHNOLOGICAL AND ECONOMIC ORIGINS OF THE INFORMATION SOCIETY 25 (1986). The key to understanding the link among media is the placement of information in digital form. Beniger suggests that the placement of information in digital form is the key to understanding the link among media. He explains:

> [T]he progressive digitalization of mass media and telecommunications content begins to blur earlier distinctions between the communication of information and its processing (as implied by the term *compunications*), as well as between people and machines. Digitalization makes communication from persons to machines, between machines, and even from machines to persons as easy as it is between persons. Also blurred are the distinctions among information types: numbers, words, pictures, and sounds, and eventually tastes, odors, and possibly even sensations, all might one day be stored, processed, and communicated in the same digital form.

Id.

33. *See* Samuelson, *supra* note 31, at 26.

> Any work that can be represented in other media can now be represented in digital form. In this form it can be used in a computer or other data processing unit, whether to be displayed or heard, or to perform some other function. Once in digital form, works protected by copyright are going to become less and less differentiated by type and more and more equivalent to one another because they will now all be in the same medium. This equivalence of works in digital form will make it increasingly easy to create a difficult-to-classify work by combining what have previously been thought of as separate categories of works. (What is an interactive annual report for a company? A literary work? A computer program? An audiovisual work?) Consequently, the elaborate distinctions copyright law has made among different kinds of works will lose much of the meaningfulness they had when media were more differentiated.

Id.

derstand the form in which electronic information can be sent from one computer to another. These are major obstacles compared to picking up the telephone and dialing a number one has dialed many times before. Yet, they are minor obstacles compared to what confronted persons who wished to communicate electronically five years ago and who encountered a much longer and more intricate list of roadblocks and obstacles. Indeed, for growing numbers of people today, sending data from one computer to another is a process that does occur routinely and is as simple as calling someone on the telephone.

Law is a process in which, using a variety of media, information is moved continuously from place to place. Citizens provide lawyers with information. Lawyers prepare documents and file them in courts and other agencies. Judges write opinions that are communicated to the profession and the public. Lawyers researching legal problems consult books, electronic sources and other lawyers. The mass media distributes information about law to citizens. Citizens communicate with other citizens about law. Groups obtain and distribute information about law to members. All of this communication touches what law is and how it works. Indeed, these and other instances of communication constitute a considerable part of the process of law. As Professor Marc Galanter has written:

> [law] usually works not by exercise of force but by information transfer, by communication of what's expected, what forbidden, what allowable, what are the consequences of acting in certain ways. That is, law entails information about what the rules are, how they are applied, with what costs, consequences, etc. For example, when we speak of deterrence, we are talking about the effect of information about what the law is and how it is administered. Similarly, when we describe "bargaining in the shadow of the law," we refer to regulation accomplished by the flow of information rather than directly by authoritative decision. Again, "legal socialization" is accomplished by the transmission of information. In a vast number of instances the application of law is, so to speak, self administered — people regulate their conduct (and judge the conduct of others) on the basis of their knowledge about legal standards, possibilities

and constraints.[34]

In the past, some of this communication was in spoken form, some in written form and some in print. Court opinions, administrative regulations and law-related news were typically in print, while communication between lawyer and citizen was oral or in writing. Time, cost and purpose typically dictated what medium would be used. Print typically cost more than the written word and took more time to prepare. Distribution of printed materials also relied on existing modes of transportation. The key advantage of print, however, was that it provided large numbers of uniform copies to recipients over a wide area.[35]

In the kind of communications environment just described, media choices were generally easy. Case reporters and scholarly journals were, quite understandably, in print. The preferred medium for transcripts of court proceedings or of depositions, however, was writing.[36] Each medium had different economic costs associated with it, different time frames, different audiences, different expectations and different assumptions.

With the advent of the new media, almost all information and all communication other than what is spoken to someone face to face, will have existed, at some point, in electronic form. There may be questions about whether the final form will be electronic or paper but it is clear that, if not now, then in the near future, virtually all information will pass through an electronic phase. Electronic form is the ticket necessary to enter the highways of cyberspace; this functional prerequisite is becoming less and less of an obstacle since, even today, a high percentage of information has been, or is, in electronic form.

The key to gaining some understanding of computer networks is to start with one of the most familiar communications

34. Marc Galanter, *The Legal Malaise; Or, Justice Observed*, 19 LAW & SOC'Y REV. 537, 545 (1985).

35. *See* George Sarton, *The Quest for Truth: Scientific Progress During the Renaissance*, *in* RENAISSANCE 55-76 (1962). "Printing made it possible for the first time to publish hundreds of copies that were alike and yet might be scattered everywhere." *Id.* at 66.

36. See Collins & Skover, *supra* note 21, at 510-11. "Paratexts are beginning to enframe the reality that was once largely the domain of print. They influence and shape depositions, presentations of material evidence, expert tests and experiments, re-enactments of events and conditions, 'day-in-a-life' accounts, settlement negotiations, and entire trial and appellate proceedings." *Id.* *But see* David Margolick, *At the Bar*, N.Y. TIMES, Dec. 11, 1992, at D18 ("Court reporters, their news seconded by many judges and lawyers, argue that electronic recording is unreliable, cumbersome, and more costly.").

devices, the telephone. Telephones are found in ninety-three percent of the homes in the United States. By pressing or dialing seven numbers, one can call in one's local area. By adding three more numbers, an area code, one can call any place in this country. By adding a few more numbers, an international dialing code, one can call almost anywhere in the world. Until recently, when telephones became combined with answering machines, fax machines and other devices, or became able to handle information in digital form, one never thought about consulting a manual to find out how to use the telephone. The "telephone book" was not a book about the telephone but, rather, a book of telephone numbers.[37] Using computer jargon, one might say that the telephone has a user friendly interface. More accurately, we should recognize that instruction in how to use the telephone occurs at an early age and that the telephone is historically an instrument with only a single capability.

Telephone communication occurs so quickly and so routinely that we rarely, if ever, consider the extraordinary path taken by the electronic signals as they leave the home or business and travel across town, country or the globe.[38] The route taken by a telephone call is worth focusing on, however, because it illustrates how the awesomeness of computerized communication arises both from the power of the highly visible machine sitting on a desk or lap, and, even more, from the signal's successful navigation through an invisible and almost incalculable number of linked pieces.

Although cellular telephones and other forms of wireless communication are becoming more prevalent,[39] it is instructive to

37. For an unusual perspective on the telephone, see AVITAL RONELL, THE TELEPHONE BOOK (1989) (examining history, psychology and politics of telephone).

38. Theodor H. Nelson, the developer of the Xanadu hypertext system, commented: "[I]t strikes me as very funny that people are not surprised that they can reach somebody on the other side of the continent by telephone and yet the idea that they could draw these things from a massive [electronic] library seems very startling." *National High-Performance Computer Technology Act of 1989: Hearings on S. 1067 Before the Subcomm. on Science, Technology, and Space of the Senate Committee on Commerce, Science, and Transportation of the United States Senate*, 101st Cong., 1st Sess., 399 (1989) (statement of Thedor H. Nelson, Autodesk, Inc.).

39. Nicholas Baran, *Wireless Networking*, BYTE, Apr. 1992, at 291 (suggesting that wireless network is "one of the most promising and widely discussed technologies" of 1990s and discussing predominant wireless technologies currently in use); Thomas A. Monheim, *Personal Communications Services: The Wireless Future of Telecommunications*, 44 FED. COMM. L. J. 335 (1992) (discussing how future development of personal communications services (PCS) may lead to existence of personal, wireless telephones with permanent tele-

focus on the physical link that exists between most homes and offices and, indeed, between virtually every location where there is a telephone. It is often said that when one person dials another person and, after a ring or two, the phone is picked up, a "connection" is made. This is accurate in one sense, in that there is an electrical connection formed between the two parties and information begins to travel between the two end points. In another sense, however, all telephone owners are connected to each other at all times. There are, of course, large numbers of calls that bounce off of satellites, but many telephone calls still pass along wires and cables and, therefore, anyone making a telephone call is connected not only with the person who answers the phone "on the other end" but with virtually all other persons possessing a telephone. Because of the seamless connections of the telephone network, we do not know the route taken by any single call or whether it traveled by wire or by satellite.

It is, if one stops for a moment to consider it, an enormously impressive achievement merely to have this physical link between millions, if not billions, of different places. Yet, this invisible network is the precondition for the communication of data and for the even more impressive technological feat of moving the data correctly from the sender to the intended receiver. In many respects, the actual telephone on a desk, no matter how many buttons or features it has, does not match the technical prowess of the network put in place to support it. The telephone may be the beginning and end point of a voice communication but the delivery system in the middle, which controls not only how quickly a call is connected but whether it is connected to the right party, is a more impressive feat of engineering than is the device that exists at the end point.

Although the telephone and its network are remarkable, they also have some notable limitations. The telephone cannot fulfill, or at least cannot fulfill very effectively, many communications goals. For example, the telephone is largely a device for one person to communicate with one other person. Although conference calls are possible, and one could conceivably talk through a speakerphone to a group of persons, such arrangements are not the norm and usually require prior preparation to assure that a group of people are near the telephone at the same time. Telephones, whether for technological or economic reasons, are most

phone number as well as wireless computer access allowing data retrieval and communication from various locations).

commonly used as an individual to individual form of communication rather than as a mass or group medium[40] or as a medium for satisfying an institutional goal.[41]

The telephone is also an inefficient means for communicating large quantities of information. While there have been many experiments involving teaching people from afar using television, video, audio tape and computers, few, if any, attempts have been made to use the telephone. Although the telephone has at least one virtue for distance learning, in that listeners gathered around a speakerphone would be able to ask questions of the speaker and get immediate feedback, even that does not compensate for the cumbersome task of arranging for groups of persons to be within hearing distance of a telephone at the same time.

Lastly, the telephone has no storage capabilities. One can, of course, use an answering machine or tape recorder to store messages or record conversations, but "[e]ven though telephone conversations can be recorded, organizing the recorded material for later retrieval is insuperably burdensome for large quantities of material."[42] Even if saving and retrieving messages became more efficient, the goal of most telephone calls is to hear and interact with a "live" voice. Thus the storage capabilities of telephones are less important than with some other media. It is often

40. *See* John R. Pierce, *The Telephone and Society in the Past 100 Years, in* THE SOCIAL IMPACT OF THE TELEPHONE 159-95 (Ithiel de Sola Pool ed., 1977). It is possible for a message to spread from one to many through use of the telephone if the message is passed along from one person to another. It is even possible, using this mode, for many people to hear of something in a relatively brief time if each hearer calls more than one person. But this method does not transform the telephone into a mass media instrument or an instrument for reliably and accurately communicating a message to many. *Id.* at 173 ("In all of their uses, however, the telephone and mass communication are poles apart. . . . Mass communication is from the few to the many; the telephone is always from person to person"). A few uses do exist that arguably employ the telephone in the mass communications business, such as in call-in radio programs where the caller is heard by a large audience, or pre-recorded messages where the telephone can be linked to a computer to automatically dial many numbers; these examples, however, illustrate atypical uses of telephone technology. *See* Cameron B. Armstrong and Alan M. Rubin, *Talk Radio as Interpersonal Communication*, 39 J. OF COMM. 84 (1989) (examining why some individuals favor interpersonal communication through mass medium, such as talk radio, rather than one-on-one communication with another person).

41. Henry H. Perritt, Jr., *The Electronic Agency and the Traditional Paradigms of Administrative Law*, 44 ADMIN. L. REV. 79, 93 (1992) (explaining that digitally recorded communications may be more beneficial to administrative agencies than telephone contact because such communications provide formal record of what statements were made).

42. *Id.*

the voice accompaniment to the information, as much as the information itself, that makes the telephone call so special.

These limitations of the telephone should not detract from what the telephone does so well, which is allow a conversation in "real time" between people who are at a distance form each other. Nevertheless, focusing on these limitations provides one easy way to understand the power and attraction of computerized communication.

Even regular computer users today may consider a computer to resemble a variety of other objects in the home or office more than it does a telephone. A computer may seem like a piece of paper when text is on the screen, like a super calculator when numbers are on the screen, like a painting canvas when an image processing program is running or like a filing cabinet when a data base is operating. Until voices routinely come out of computers,[43] as they will in the future, it is understandably difficult to perceive the computer as having similarities to the telephone, or indeed as being the preferable instrument for communicating a message from one place to another.

What computers and telephones share is the ability to communicate information over a network at incredible speeds. When a judge asked a defendant, in a celebrated case of breaking into computers, to explain the term "hacking," the defendant replied that "[h]acking is the modern art of telephoning."[44] Such a statement reflects the position of a person who sees the computer solely as a communications device, as a means for obtaining electronically stored information in any computer that is linked to other computers. While the hacker may have an undeveloped moral sense, he sees more clearly than most that the computer and the telephone often share space on the same network.

Yet, just as the computer has overlapping qualities with books and calculators, but also possesses additional textual and numerical capabilities, the computer is both more and less than a telephone. One communicating today using a computer gives up

43. For a description of such a computer, see Maureen Caudill, *Kindler, Gentler Computing*, BYTE, Apr. 1992, at 135-50 (noting that Next machine systems and Macintoshes already posses sound capabilities and suggesting that standard output features will soon include not only speech but also humanlike gestures and virtual reality environments).

44. KATIE HAFNER AND JOHN MARKOFF, CYBERPUNK: OUTLAWS AND HACKERS ON THE COMPUTER FRONTIER (1991); *see also* BRUCE STERLING, THE HACKER CRACKDOWN (1992); Saffo, *supra* note 27, at xiv ("The phenomenon of widespread electronic intrusion is very recent. It is made possible by the proliferation of personal computers and their connection to electronic networks.").

some of the personal quality that comes from hearing the human voice on the telephone as well as from obtaining the immediate feedback that occurs as two people are connected at the same time. When a computer is connected to a telephone line or to some other electronic network, however, the user acquires capabilities that are not possible today when the human voice is sent over wires. These novel qualities of computers include the following:

> 1. Computers can send messages to many people simultaneously. While the telephone fosters one to one conversations, computers are equally adept at sending messages to one recipient or to many, to communicating with individuals or with groups of people. Until now, face to face communication was the only way for groups of people to have discussions and reach decisions.[45] Repeating a message many times or sending a set of copies of a message to many different addresses, however, is a simple task for a computer. Those who are new to electronic communication are often surprised that they not only have new capabilities for writing and composing, but that there are options for distribution that did not exist in the print era. The computer can even turn individuals and small groups into publishers in ways that were not possible before.[46]
>
> 2. With computerized communication, a person can, with equal ease, send both small and large amounts of information. Having a long conversation on the telephone obviously takes longer than does a short conversation. Electronic messages are sent at such high speeds that it may take no more time to send a long message than a short one.
>
> 3. Computers can store increasingly large quantities of information and make possible very fast searches of these growing collections of data. The computer uses information in digital form and this underlies all of the

45. STARR R. HILTZ & MURRAY TUROFF, THE NETWORK NATION: HUMAN COMMUNICATION VIA COMPUTER (1978).

46. *See* Henry H. Perritt, Jr., *Tort Liability, The First Amendment, and Equal Access to Electronic Networks*, 5 HARVARD J. L. & TECH. 65, 67 (1992). Concerning e-mail and electronic publishing, Professor Henry Perritt has written that "[t]hese technologies blur at their margins, and, with the advent of networks that handle information at varying levels of abstraction, sometimes become indistinguishable." *Id.*

machine's powerful capabilities. On the other hand, the telephone is still largely an analog device. While new methods of organizing and searching voice recordings are emerging, it is still much more cumbersome to store and use such material than textual material.[47]

4. Time and place are not as constraining with computerized communications. There is no requirement that the recipient of a message be in a particular place at a particular time when one sends a computerized message. Such messages are retrievable from any place at any time. Telephone messages frequently lose value when they are left in answering machines because the purpose of most telephone calls is not simply to leave a message but to interact and quickly exchange information. "Telephone tag," the game of leaving messages on answering machines, is an irritating inconvenience with voice communication. For electronic communication, however, the asynchronous quality, where a message is read, considered and responded to at some time after the message is sent, is a benefit. A recipient of an electronic message will have some time, at least, to reflect on the content of the message. Thus, what is annoying for voice communication is generally considered a virtue for electronic communication since electronic communications can be read at one's convenience. In addition, electronic communication rarely interrupts meetings or conversations as telephone calls do. Nevertheless, whenever there is a need for an instantaneous answer, the telephone may remain a more appropriate instrument than the computer.

While both computers and telephones rely on a network to

47. To some extent, these more flexible and powerful capabilities for storing, copying, reusing and distributing some kinds of information are a consequence of great differences in how we traditionally have used and relied on print, writing and the spoken word. Until the last century, it was not possible to store sounds. We have a fairly long experience, however, with print and writing. Sound in stored form, therefore, is part of the new environment and this sound will be presented to us in fairly novel ways. Once sound is in digital form, it can be combined with other information in electronic form. As computers evolved, they acquired new capabilities for working with words. Further increases in power have provided graphical capabilities. The process of attaching sound to documents may appear unnecessary and strange but this may simply reflect assumptions that are a result of our print tradition. There are no longer any technological reasons why electronic documents cannot have sound and text as easily as they have images and text.

send and receive information around the globe, the additional power and flexibility of the computer will often make it the technology of choice over both the telephone and print. The computer will not replace the telephone, but it may displace it, in that the computer will be used for some purposes that the telephone now satisfies as well as for many other purposes, such as publishing, that go far beyond the capabilities and use of the telephone.

A. *Models of Communication*

The appeal of the computer for communicative purposes, combined with the inherent flexibility of computerized networks, has lead to an extraordinary increase in computerized communications over the past few years. For example, in spite of mediocre software and a user unfriendly environment, the number of networks linked to the Internet[48] increased from 173 in July, 1988 to 7854 in November, 1992 and the number of packets sent grew from 152 million in July, 1988 to over 23 billion in November, 1992.[49] Experts estimate that usage of the Internet increased one thousand fold between 1985 and 1992.[50] The attraction of this form of communication might be clearer to non-users if one compares the basic model of telephone communication with the several different models of distributing information electronically. The basic telephone model consists of a human calling another human. At its simplest, this model has two humans and two telephones (or two humans, two telephones and an answering machine) linked together. In such a model, the human uses the first telephone to call the second telephone that is answered either by another human or the answering machine. The answering machine is basically a temporary storage area for messages, automatically answering the telephone and allowing the recipient to retrieve the message later.

48. *See* Johna T. Johnson, *NREN: Turning the Clock Ahead on Tomorrow's Networks*, DATA COMM., Sept. 1992 at 43. Johnson describes the Internet as a "collection of interlinked commercial and educational networks in the U.S. and overseas." *Id.*; *see* ED KROL, THE WHOLE INTERNET USER'S GUIDE & CATALOG (1992) (explaining how Internet system transfers files, utilizes electronic mail and provides information). *See also* JOHN S. QUARTERMAN, THE MATRIX 277-338 (1990) (describing and explaining services provided by networks in United States and worldwide that are connected to Internet).

49. These data were obtained via file transfer protocol (FTP) from the history.netcount and history.packets files in the /nsfnet/statistics directory of NIC.MERIT.EDU.

50. *See* KROL, *supra* note 48, at 1. ("In the past seven years, the number of Internet users has increased a thousand-fold.") This number is now doubling every year. *See* Johnson, *supra* note 48, at 55.

Computer mediated communication can occur in a similar manner. In the simplest use of the computer for communication, an individual uses the machine in a manner similar to a telephone, composing a message and sending it over the network to another computer, which stores it until a second human looks at the information. This type of communication is called electronic mail (e-mail) because it appears similar to sending a letter or message via the Postal Service. Because it is in electronic form, the message is easily stored, replied to, or forwarded to others. In the typical e-mail model, the receiving computer is like an answering machine in that it receives and stores messages until the recipient can look at them. The receiving computer does differ from an answering machine in that the computer receives every call and an answering machine is only an alternative receiver to a human.

Because of the ability to send the message over great distances almost instantaneously, it might have been just as appropriate to employ a term that emphasized a connection to the telephone as to suggest a link to the postal service. In the future, when sounds may be sent as part of an e-mail message, and when we become accustomed to hearing sounds emanating from the computer, this connection to the telephone will become more obvious and the mail analogy may appear anachronistic.

E-mail requires a modem, a link between computers and communications software. The software structures the electronic environment, dialing the telephone number or network connection of the computer where the recipient has an e-mail address, acknowledging electronic signals and automatically handling other chores that are necessary to move signals over a network.[51] An e-mail address is the equivalent of a "mail box" or place where messages are collected until they are looked at by the recipient. Most of the popular commercial services, such as Compuserve, Prodigy or GEenie, in addition to providing other services, provide users with electronic addresses. The addressee can have his or her personal computer dial the host computer, send the host an account number and a password to gain access, and the e-mail messages will then appear on the screen. These messages can be read, downloaded to the addressee's computer or, if desired, printed on a printer.

51. ED PAULSON, THE COMPLETE COMMUNICATIONS HANDBOOK 191-93 (1992) (suggesting that rapid increase in the use of electronic mail is primarily result of improvements in software and describing several developments in communications software).

While e-mail's similarity with ordinary mail is often questionable for the one-to-one forms of electronic communication, it is even more inappropriate to use the term e-mail to designate a general category covering other forms of electronic communication. Once information is placed into electronic form, it can be communicated in ways not before possible. Some e-mail may have the tone of a letter or in-house memo, but some may not. More importantly, computer based communication is different from both mail and the telephone because data in electronic form can be copied easily and distributed so much faster than information in any other medium. Thus, the simple e-mail model of electronic communication just described is only one of several new communication patterns among people and computers. The telephone model is fairly rigid and resistant to new uses, while the computer is both more powerful and more flexible.

Several important models for electronic distribution and publishing of information that go far beyond the e-mail model are already in large scale use.

1. *Model One*

Figure 1 represents one person using a computer to send the

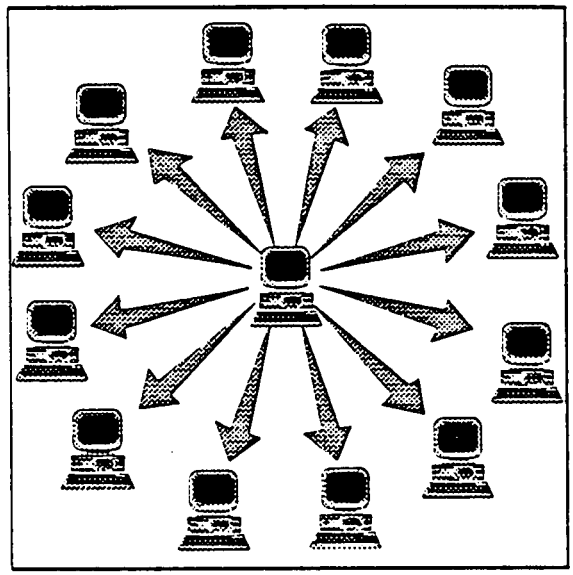

Figure 1

same message to several persons. This involves no extra work for the sender and minimal extra demand on the computer's re-

sources. Such capability for broadcasting or distributing messages is a common feature of communications software used for e-mail. The sender of a message merely creates a list of electronic addresses. The software then automatically does all the "labeling," "addressing" and distribution.

This model moves computerized communication closer to writing or print because it is similar to typing the notation "cc:" at the bottom of a memo or letter, sending copies to a list of people, or using mail merge features of a word processor to send the same letter to many different persons. When done electronically, however, copying and sending is much easier than when the same task is done with a letter or memo. Most e-mail software allows an individual to use a distribution list with many names and addresses; sending a message to all of these persons is as easy as sending a message to one person.

2. *Model Two*

Figure 2 represents a second model that further expands the

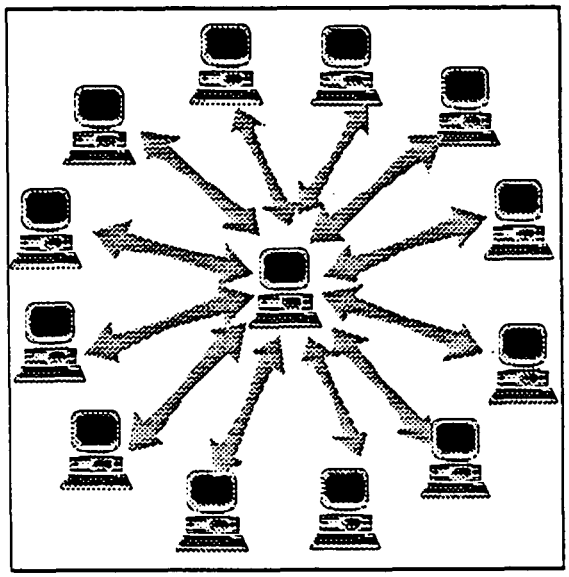

Figure 2

ability of one individual to reach a potentially large audience. While the first model was a one-to-many model, the second model is a many-to-many model. In this model, an individual composes a message and sends it to a central computer. This computer has a list of addressees to which it forwards a copy of

any message sent to it. The central computer copies any message it receives and distributes it automatically. The central computer does not originate messages, but forwards any message sent by anyone on the distribution list to all others on the list. Such an arrangement means that anyone who sends a message to the central computer will have the message copied and distributed to the whole distribution list. This model tends to foster a much more active flow of information than the first model since every sender of a message has the same distribution list and many recipients will comment on messages they receive by sending a message back to the central computer.

With this model, senders of messages may not even know how large the distribution list is or who is on it because all an individual has to do is send one message to one computer. One can distribute a message broadly without preparing a distribution list of one's own. Being able to send a message to the central computer is like having access to a mailing list without having to print copies of the mailing, without having to affix mailing labels and without having to take the material to the post office. Thousands of subject oriented groups are currently using this model on the Internet.[52]

Our language is struggling to find an appropriate term for this process that turns computerized communication into a medium of mass communication. There seems, on the surface at least, to be a basic similarity between this model and print; in both, one machine makes a lot of copies of a message and distributes them. There are, however, notable differences from print. There are, for example, different economies of scale for this model of electronic communication. With print, per copy costs decrease as press runs increase. With electronic distribution, this may not occur and it may be no more cumbersome and take little more time for the central computer to resend the message to five thousand persons than it takes to send it to five or five hundred.

The difficulty in choosing a widely acceptable term or phrase for such communication is also partly a consequence of the fact that the model is so much more flexible than writing or print and, therefore, can resemble more than one familiar form of communication. For example, the model supports a small group or an entity with many members. When the central computer is forwarding messages among five or six persons, the pattern of

52. Academic list files prepared by Diane Kovacs are available via FTP from ftp.cni.org.

discussion can resemble an extended luncheon conversation. When twenty or thirty persons are circulating messages, the model might be thought of as a small conference. When larger numbers of recipients are involved, there are analogies to newsletters, journals or newspapers.[53] As this indicates, the model operates in a wide variety of forums, some of which have print antecedents and some that do not.

It is often stated that the computer can turn anyone into a publisher. Such a statement usually refers to the capability, provided by word processors and desktop publishing software, to create documents and newsletters with sophisticated designs and typefaces. Thus, the statement suggests that everyone can become a publisher because it no longer costs a great deal to create a printed "look." Small groups can create documents that appear to be typeset.

An electronic network turns everyone into a publisher in a different and more meaningful way. The network provides the facilities for individuals to distribute their messages efficiently and cheaply, both widely and narrowly, to large groups as well as small. Using today's technology, the message sent from another computer may not actually have the "look" of print when it appears on the screen, but it may have been distributed to hundreds, if not thousands. Such widespread distribution is possible because the process is much faster and much more flexible than that used for distributing the printed word.

Figure 2 clearly represents a publishing model of electronic

53. There are increasing numbers of electronic journals and newsletters. It is estimated that there are approximately 15 refereed electronic journals, and one hundred unrefereed journals and newsletters. USENET employs a somewhat different copying, forwarding, and subscribing process and provides something resembling unedited newspapers through its approximately four thousand newsgroups. There are no accurate counts on how many total subscribers there are to USENET newsgroups but the most common estimate for the fall of 1992 was 3 to 4 million. Communication from Ann Okerson, Association of Research Libraries, December 21, 1992.

Electronic distribution affects formats as well as distribution patterns. As a result of the typically cumbersome and expensive methods used to distribute print publications, they are divided into issues and a certain number of issues are printed each year. This also makes later access easier when a yearly index is prepared. Thus, while bundling a publication into issues and volumes seems natural, it is really a consequence of the influence of the print environment. Electronic journals can distribute an article as soon as it receives editorial approval. Similarly, indexes may not be needed as searching techniques improve. In summary, the electronic environment not only changes the tools used for distribution but changes assumptions about material that is distributed and allows for new models in presenting information. Some types of electronic bundling of information will look like their print ancestors and some will not.

communication, in that it makes it possible for an individual or group to share with, and distribute ideas and information widely to, other individuals and groups. It is not, however, a publishing model with all of the same components as print publishing. For example, while the central computer that forwards messages can be an effective distributor, there may be no editor because the machine may be programmed to distribute every message sent to it. Indeed the value that is added to information in typical print publishing differs considerably from the value that is added currently in electronic publishing.[54]

For print, there is a principal or paradigmatic publishing model; an author provides a publisher with a work and, after editing, the publisher sells the work to as many purchasers as possible. This model exists for the news media and for trade and scholarly publishers. The economics of print are fairly straightforward, at least as compared to the model of electronic publishing, because the publisher knows how many copies must be sold for the work and the firm to be successful.

Electronic publishing is still developing, but it appears clear that there will be many different models, some of which are quite different from the main print model. In general, distribution options increase because of both the ease of copying and the speed with which such information can be transmitted over a network, although this may pose enormous challenges to copyright law and to financial investments. This is particularly true for distribution patterns that are diffuse and decentralized, such as in Figure 2, where individual recipients of electronic information may copy the information and begin a new distribution process by forwarding it to others or by sending it to another computer with a different distribution list.

Electronic publication differs from print in that the reader has the right to keep self-generated copies, rather than to purchase one of multiple copies produced by the publisher. The publisher provides access to a single copy which, because of the computer's capability for making exact copies, is brought over the network from the large computer to someone's personal com-

54. *See generally* Henry H. Perritt, Jr., *Market Structures for Electronic Publishing and Electronic Contracting on a National Research and Education Network: Defining Added Value, in* BUILDING INFORMATION INFRASTRUCTURE 344-401 (Brian Kahin ed., 1992) (highlighting ten types of value that can be "unbundled, supplied, and assembled through high-speed digital networks": authorship, chunking and tagging, internal pointers, external pointers, presentation, duplication, distribution, promotion, billing and integrity assurance).

puter. The image on the screen is not the original but a copy. If the sender and receiver are seeing the same images on their screens, then there are two copies. One writer has suggested that, "[a]ll digital machines copy in order to communicate. They are essentially repeaters, able to regenerate perfect copies with abandon."[55] The language that is used in reference to computerized communication, therefore, can be misleading because it may fail to take the copying-communications process into account. For example, to say that a file is sent from one computer to another or that e-mail is sent is not accurate because it is always a copy of a file that is transmitted and not the original. The fact that communication necessitates copying and that powerful tools exist for working with and altering copies in digitized form is both a catalyst to creative work and a source of the problems facing contemporary copyright law.[56]

3. *Model Three*

Figure 3 portrays many computer users individually communicating with another computer, and obtaining information from that machine. The users want to retrieve information stored on the remote computer. Unlike some of the previous models, computer users in this model do not use the large computer to communicate directly or to share information, with other users. Compared with the model represented in Figure 2, whoever operates the central computer may exercise considerably more control over communication. Examples of this model are large commercial databases, such as LEXIS/NEXIS, WESTLAW, DIALOG, on-

55. Richard J. Solomon, *Computers and the Concept of Intellectual Copyright, in* ELECTRONIC PUBLISHING PLUS 238 (Martin Greenberger ed., 1985).

56. *See* Samuelson, *supra* note 31, at 26 (noting that copyright owners are finding it increasingly difficult to prevent replication of their works because reprography has improved, digital form is easier to copy and to steal, and because public perceives such replication as lawful); *see also* Ethan Katsh and Janet Rifkin, *The New Media and a New Model of Conflict Resolution: Copying, Copyright, and Creating*, 6 NOTRE DAME J.L. ETHICS & PUB. POL'Y 49 (1992) (suggesting that mediation might be more appropriate than litigation for resolving copyright problems with electronic communication because it puts decision making in hands of parties, allows parties to vent emotion, offers greater flexibility in settlement, protects relationships, and because it is informal, confidential, quicker and more cost effective); Pamela Samuelson, *Digital Media and the Changing Face of Intellectual Property Law*, 16 RUTGERS COMPUTER & TECH. L.J. 323 (1990) (citing six characteristics of digital media that make it difficult to protect copyrighted material: (1) ease of replication; (2) ease of transmission and multiple uses; (3) plasticity of digital media; (4) equivalence of works in digital form; (5) compactness of works in digital form; and (6) new search and link capacities).

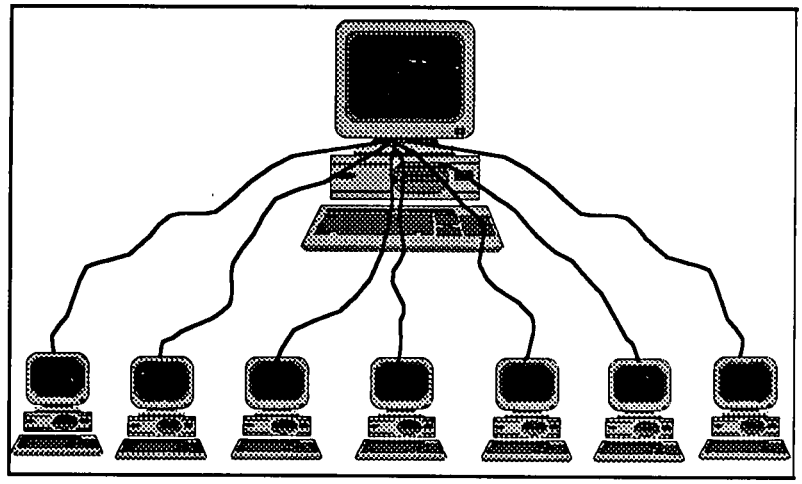

Figure 3

line library catalogs, FTP sites on the Internet, and other electronic information services.

The model represented in Figure 3 has been, thus far, the most economically viable model of network publishing. The main reason for this is that it contains a point of access that can be controlled allowing charges to be levied before access is granted.

The large computer, the source of information in Figure 3, may be a single large computer or it may be a set of computers linked together. The user, in a highly efficient system, may not even be aware of this. Because information in electronic form can travel so quickly between computers, a user can think that he or she is connected to one computer when, in fact, they have been routed to some other computer. Selecting from a menu, a user can also shift quickly from one computer to another. For example, a person wishing information that is available through the DIALOG database can dial DIALOG directly and obtain the information or, if someone has access to WESTLAW, can access DIALOG databases by selecting them from the WESTLAW directory menu. Users of the Internet have access to similar capabilities through Gopher[57] or the World-Wide Web,[58] software

57. Gord Nickerson, NETWORKED RESOURCES' COMPUTERS IN LIBRARIES 54 (1992) ("[Gopher] allows a user to access various types of data on multiple hosts in a seamless fashion using a client-server communications model," and "provides an easy way of organizing both local and remote resources to provide better access for users and to help make the electronic library a reality.").

58. *See* KROL, *supra* note 48, at 227-42 (explaining World Wide Web (WWW), hypertext information service of Internet).

that allows users to select from a menu of information and to be connected to the computer upon which the information selected is stored, wherever it might be.

If the system were indeed "seamless," users would be less aware of the source of the information they are seeking. We are not yet at this point[59] and, indeed, most individuals would be fairly satisfied if they were simply able to dial a single computer, to access it and to retrieve information from it in an easy and routine matter.[60] While this is a difficult chore for many, increasing numbers of persons feel quite comfortable today jumping from one remote computer to another and obtaining information using what is an electronic version of "interlibrary loan." In print libraries, interlibrary loan allows access to materials held in another library. The links between sources of information on a computer network allow not only borrowing from a second library, but actual access to the second library—located at some distance to the first—where you can browse and retrieve needed information.[61]

59. It is worth recognizing that the Internet is built upon an assumption of seamless communication. The Internet is not itself a network but a collection of networks that are linked to each other and can share information with each other because of agreements about how information will be transmitted. The seamlessness is evident from the fact that many frequently assume that they are connected to the Internet even though what is occurring is that a user on one network is connected to a machine on another network. What is shared is not a single network but a set of communications protocols that may make it seem that there is only one network.

There are increasing numbers of books being published about how to use the Internet. There are also materials about the Internet accessible electronically via FTP, for example from NIC.MERIT.EDU or FTP.SURA.NET, or through use of the Internet accessible computers at Cornell Law School and Washington and Lee Law School. For a description of the Internet system at Cornell Law School, see *supra* note 29. In the fall of 1992, Richard Smith of the University of Southwestern Louisiana gave an electronic course on how to use the Internet for over eight hundred persons around the globe. The materials from this course are available via FTP from ubvms.cc.buffalo.edu in the gopher/internet/navigating-workshop directory.

60. A familiar non-legal example of when virtually seamless communication among computers occurs is the use of a banking card to obtain money from an automatic teller machine located outside of the bank's local area. This transaction takes place almost as quickly in a remote location as when the transaction is made using the bank's own teller machine, even though there is complex interaction and communication among computers that may be thousands of miles apart. It is an activity that, for most persons, is as easy as making a telephone call. This transaction is a function of efficient networking among financial institutions and suggests that other, non-financial information might eventually be accessed routinely as well.

61. For those connected to the Internet, the two sources with law-related material that illustrate this process most clearly are the computers at Cornell Law School's Legal Information Institute and at the Washington and Lee Law

The concept of electronic inter-library browsing is illustrated in Figure 4. In this model, users of computers in the bottom of the illustration who are connected to the large computer in the center can obtain information from any of the computers at the top.

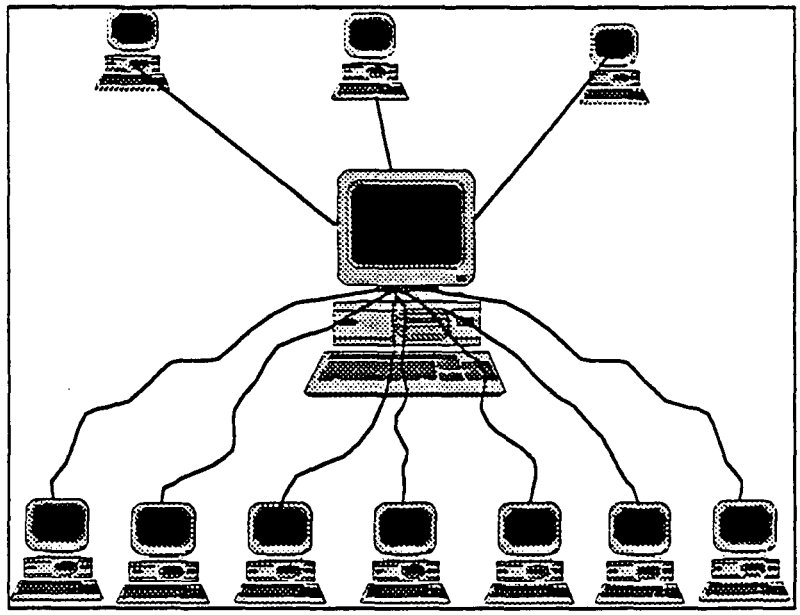

Figure 4

The above models do not cover every form of electronic communication. Experimentation with hybrids and combinations, the continuing expansion of electronic networks, combined with the flexibility of information in electronic form, will inevitably encourage both experiments and entrepreneurs. This Article also has not addressed the closest parallel to print publishing, the distribution and sale of disks and cd-roms. While information on disk can be employed, copied and processed as effectively as information obtained over the network, the electronic network can

School. A user can travel from one computer to many others by logging on to an Internet computer and typing the following at the prompt: Telnet fatty.law.cornell.edu. After the connection is be made, the user types the word GOPHER and presses enter. A menu with many options for Internet travel will appear on the screen. A user can connect with Washington and Lee by typing: Telnet Liberty.uc.wlu.edu and, then, when asked for a name, by typing LAWLIB.

GOPHER is software following a simple protocol for tunneling through a TCP/IP internet. Information accessible through gophers can be discovered through software called VERONICA (Very Easy Rodent-Oriented Net-wide Index to Computerized Archives).

be employed to connect to other networks, providing individuals with opportunities to distribute information in ways not possible with disks and cd-roms.

Many readers may be familiar with one or more of the models just described. All law school students learn how to retrieve data from LEXIS or WESTLAW (Figures 3 and 4). Many law firms and businesses, have local area networks (LANs) that connect computers in the firm and allow attorneys to send e-mail and other information to each other in electronic form. Some individuals may subscribe to CompuServe or Prodigy or some other service that provides them with both an electronic address and access to a large data base of information. Academics are increasingly familiar with the Internet, which also supports all of the models identified.

Communication using computers can only increase as software becomes easier to use and automates many tasks, as screens become able to show clearer images, as faster networks are employed in lieu of telephone lines, and as computer users become more knowledgeable about using electronic data and see the benefits of obtaining data in electronic rather than printed form. All of these developments exert pressure on the law because of changes in the flow of, and ability to control, information. If law is a method of dealing with information, of structuring and organizing it, of storing it, of evaluating it, of regulating access to it and of communicating it to the public, then a more powerful and efficient network, which touches all of these functions, makes it less and less likely that past practices will provide the basis for future practices and that modes of organization that were successful in the past will continue to be successful in the future.

The following section describes, in a more generic way, two perspectives on space that can provide understanding of why change occurs as new information technologies are employed. The first concerns physical or geographical space, which, quite evidently, becomes not as great a constraint in obtaining information or in developing new working relationships as it was in the past. The second focuses on informational space, a concept that allows us to understand why some information is hard to obtain or use even though we may be physically close to it. Each medium creates its own form of informational space that affects who uses information and in what manner.

Describing and measuring informational space is particularly

relevant to any consideration of the legal profession. The lawyer has a relationship with information, and changes in how information is presented create a new "distance" between user and information that is different from the distance that exists in a print environment.

II. TIME AND SPACE

If the dull substance of my flesh were thought,
Injurious distance should not stop my way;
For then, despite of space, I would be brought,
From limits far remote, where thou dost stay.
No matter then although my foot did stand
Upon the farthest earth removed from thee;
For nimble thought can jump both sea and land,
As soon as think the place where he would be.[62]

In 1987, scientist Peter Denning wrote that:

> Computer networks that nurture networks of people are the culmination of a process of evolution that can be said to have five stages: (1) file transfer, (2) remote connections, (3) distributed computation, (4) real-time collaboration, and (5) coherent function. At the first stage, a network is able to transfer files of information among computers, but without guaranteeing delivery time; this stage is sufficient to support electronic mail, bulletin boards, news services and jointly authored papers. At the second stage, the network enables a user to connect to remote resources, such as instruments, computers, or databases, and employ them in real time as if they were local. At the third stage, the network is able to support distributed computations that include computing processes and resources at widely separated nodes; an example is a user interface process on a workstation, connected to a numerical process on a supercomputer, connected in turn to a graphics display system. At the fourth stage, the network directly supports collaboration by permitting real-time conferences of users at different workstations, who can communicate as if they were gathered around one workstation — that is they can tap into a "common universe" in which they can talk, point to

62. William Shakespeare, Sonnet No. 44.

> and share objects, edit and run programs, and examine outputs. At the fifth stage, the network is a coherent system comprising people and the resources contributed by them; each person can look in at this world from his workstation. The network will provide services to help people locate, use and contribute resources, and to translate between the terminologies of the disciplines.[63]

We are, at present, some distance away from an easy to use, flexible, widely accessible and broadly used network of electronic communication. Opportunities still exist for entrepreneurs to create new communication systems and to improve existing communication networks that are presently underutilized.[64] In addition, a vital need exists for software that enhances and facilitates use of the online environment.

Most of Denning's stages have been realized, but only for the relative few. The Internet is a structure that is habitable but not particularly hospitable. Yet, it has experienced extraordinary growth in spite of its user unfriendliness. In the near future, however, hardware that currently is considered to be state of the art will become commonplace and will process and move data faster on equipment that uses graphical screens and other user friendly devices. In addition, software written to take advantage of this hardware will be smarter and will better understand areas of difficulty for users. This will eliminate a variety of current bottlenecks and make acquiring and transmitting data considerably easier than it now is. Increasing amounts of information will be available only in electronic form and this will certainly enlarge the market of electronic communicators. As a result, growing electronic links between persons and persons, persons and computers and computers and computers may be the most significant development of the next stage of the computer era.

It is reasonable to expect that by the end of the decade, large numbers of persons who will have a desire to transfer or obtain data from some point thousands of miles away will be as comfortable doing so as they are calling another person on the telephone. New tools will be available to assist in extracting information from remote databases and other electronic sources of information. For many individuals, this capability is a reality today; for these people, computer networks are the medium of choice for sending

63. Peter Denning, *A New Paradigm for Science*, 75 AM. SCIENTIST 573 (1987).
64. Daniel P. Dern, *Plugging Into the Internet*, BYTE, Oct. 1992, at 149.

and receiving data from colleagues and associates. While the non-voice technology of choice today may be the fax machine, which is far easier to use although less flexible than computer based communication,[65] by the end of the century, the computer will be recognized as a desirable means for sharing and communicating information. People will understand that communication in this manner opens up opportunities not available with mail, the telephone, fax, or, most importantly, many traditional forms of print.

One of the variables that will affect this change in attitudes is the building of a user friendly network that can carry data more quickly, more efficiently and more reliably than telephone lines. This is an enormously important undertaking, one that is currently ongoing and is involving government much more directly than it has been involved in most recent computer-related developments. An analogy that is often used to make clear the computer-network relationship is that between automobiles and highways. Government has left the development and marketing of automobiles largely in private hands whereas the building of highways, which allows cars to move faster and thus increases the demand for cars, has been considered to be an appropriate activity for public authorities. Similarly, government is becoming involved in building electronic data highways: encouraging further uses of electronic communication.[66] Many details of governmental involvement in the new electronic networks are still not clear,

65. The inefficiency of the fax machine has been described by Nicholas Negroponte as follows:

> The notion of 'imaging' documents in general and the presence of fax machines in particular are setting back by decades the cause of making information more readable to computers.
>
> Just think of how this inefficiency is part of your own behavior. You type a letter on a word processor, print it on a laser printer and stuff the hard copy into a fax (or use a fax modem). The last step in this chain just deleted the computer-readable format of the text; the recipient can no longer use the text in an information management system that would have access to the content. Yet we all do this because there are more fax machines than coherent electronic mail systems (let alone systems capable of interpreting page description languages).
>
> The fax, a dumb terminal par excellence, perfectly represents the services that result when we do not focus on the intelligence of the network and its ends but instead rely on the lowest common denominator of transceiver. Making such mistakes grossly limits the quality and originality of the products and services that can later arise.

Nicholas Negroponte, *Products and Service for Computer Networks*, SCI. AM., Sept. 1991, at 113.

66. *See Hearings on S. 1067, the National High-Performance Computer Technology Act of 1989, Before the Subcommittee on Science, Technology, and Space of the Senate Committee on Commerce, Science, and Transportation of the United States Senate*, 101st Cong.,

but in 1991, Congress passed the High-Performance Computing Act, authorizing the development of the NREN, the National Research and Education Network.[67]

Changes expected before the end of the millennium rest on the development of NREN, an endeavor expected to cost more than a billion dollars. This undertaking is focused on putting into place, by 1996, a network that is capable of transferring one billion bits per second. Eventually, this one gigabit speed would be increased to three gigabits or more. Such speeds are virtually incomprehensible in terms of everyday experience, but one can compare them to the present highest network speed of forty-five megabits or forty-five million bits per second by considering the difference between a system, such as the Internet, which allows fifty single spaced pages to be transmitted in a second, and NREN which will allow thirty thousand pages to be transferred in a brief moment.

During the summer of 1992, I participated in the Electronic Conference on the Influence of E-Mail on the Legal Profession.[68] Due mostly to the initiative Professor Trotter Hardy of the College of William and Mary School of Law and David Johnson, an attorney with the Washington, D.C firm of Wilmer, Cutler and Pickering, fifteen attorneys, professors and law librarians discussed, over a three week period, the implications of using electronic mail in law practice. All communication among the participants took place electronically. Professor Hardy employed the model in Figure 2, in which participants sent comments to a computer at the College of William and Mary. This computer, in turn forwarded theses messages to every other participant. Most academic participants had e-mail addresses on the Internet and others received their e-mail through private services such as MCIMAIL or CompuServe.

At the time of the conference, the participants were unsure of the impact e-mail would have on the profession. All of the practitioner participants used e-mail, but they were at the electronic vanguard of the profession. The most obvious benefit to the

1st Sess., 279 (1989) (testimony of Robert E. Kahn) (arguing for creation of National Research Network).

67. CHARLES MCCLURE ET AL., THE NATIONAL RESEARCH AND EDUCATION NETWORK: RESEARCH AND POLICY PERSPECTIVES (1991); BUILDING INFORMATION INFRASTRUCTURE (Brian Kahin ed., 1992); Johna Till Johnson, *Turning the Clock Ahead on Tomorrow's Networks*, 21 DATA COMM. 43 (Sept. 1992).

68. See Trotter Hardy, *Electronic Conferences: The Report of an Experiment*, HARV. J.L. & TECH. (forthcoming).

practitioners was that e-mail allowed communication and sharing of information internally with other members of a practitioner's firm. Additionally, some attorneys used e-mail to communicate with clients and others.

The underlying concern of practicing lawyers "attending" this e-mail conference was how e-mail might be employed to save time. This is the attraction and main value of computers generally for lawyers, since greater efficiency and increased output in a shorter period of time often results in direct economic benefits. There is no expression that is understood as clearly as "time is money" and computer use, therefore, will continue to increase among lawyers as long as the machines are perceived to reduce the first part of the "time is money" equation or increase the second.

Ingenious attorneys will undoubtedly translate the ability to exchange information at incredible speeds into income producing opportunities. Efficient networks, in this sense, can be viewed as simply reinforcing and adding to the capabilities of stand-alone computers that automate tasks and increase the speed with which they can be accomplished. Time savings and claims for efficiencies and economies thus provide the basic incentive, rationale and justification for investing in new technology.[69]

As is true of almost any technology, however, unintended and unanticipated effects and consequences are inevitable. These side effects will impact both users and institutions of which the user is a part. These societal and institutional effects of information technologies seem to be less clear and less widely understood for communications technologies, however, than for some other technologies. Nuclear power, for example, not only provides individuals with energy but may have health or ecological consequences. Automobiles not only provide transportation but have affected the environment, urban economics and family life. In each of these cases, not every implication of using the technology may be fully understood, but the technology is broadly recognized as doing more than simply satisfying society's demand for cheaper energy or a more flexible mode of transportation. With new communications technologies, unfortunately, the social impact is harder to measure and is much less obvious.

The view that computers can satisfy needs more cheaply and efficiently and yet not change the people or institutions that use

69. *See* V. MITAL & L. JOHNSON, ADVANCE INFORMATION SYSTEMS FOR LAWYERS (1992) (stating this basic theme).

the technology is not very realistic. An individual users' needs may be satisfied in a more economical manner, but, as information begins to be used in new ways, computer based communication will also cause important changes in institutions. In other words, at the same time that individuals and firms are trying to ascertain whether they are accruing any economic benefits from their investments in technology, other kinds of dividends or effects can be occurring to the institution or to the public. The key reason for this is not that new forms of access to information allow users to do things more quickly or more conveniently, but that they do them differently than before. Speed and convenience may be the attraction for new computer users and the justification for purchasing hardware and software, but most users at some point find themselves using information differently, possessing information that they would not have had previously, asking questions they might not have asked previously and working with people they might not have had contact with before. As Professor Peter Martin has recognized:

> Inevitable changes in methods of information distribution and scholarly communication are likely to threaten not only the ways of working (which we find so comforting and take so much for granted that we identify them with work itself), but also important values that we see, quite rightly, as embodied in institutional structures that rest precariously on obsolete technology.[70]

As a greater variety of information becomes available to us without having to go anywhere for it, new opportunities and ways to use information arise that were not previously available.[71] Individual expectations change as new abilities to acquire, to process and to distribute information appear. Even more importantly, pressure for social and institutional change builds. The library or other source of information is brought closer; some groups or individuals may now have access to some information for the first time.[72] These kinds of changes are not always

70. Peter Martin, *How New Information Technologies Will Change the Way Law Professors Do and Distribute Scholarship*, 83 LAW LIB. J. 633, 641 (1991).

71. The most thoughtful and comprehensive analysis of specific differences between print and electronic publishing and of opportunities for adding value to information once it is in electronic form is Henry Perritt, *Market Structures for Electronic Publishing and Electronic Contracting*, *in* BUILDING INFORMATION INFRASTRUCTURE 344-401 (B. Kahin, ed., 1992).

72. This is a concern that has been raised about other new technologies. In

easy to discern or to gauge because the first steps and experiments in using electronic information may be quite tentative.

To understand how and why law and the legal profession are changing, however, it is necessary to recognize that the changes that are occurring inevitably will go beyond more efficient management of time. Even if lawyers are able to extract large economic benefits from the technology by being able to do more in less time, other significant changes in law can be expected to be occurring, albeit out of general view and without much awareness. Speed and time savings may be the driving forces behind the growth of electronic communication in law, as elsewhere, but the keys to understanding any structural changes that may be occurring lie along a different dimension, that of space and distance.

In this regard, even though no breakthroughs were announced or even novel uses of e-mail described, the electronic e-mail conference was an intriguing experiment. What was highlighted was not the message and *what* was said, but the medium and *how* things were said. The technology allowed a participant to feel as if he or she were attending a conference—a novel and revealing experience. The participants engaged in an active give and take with a rather high level of interaction. It seemed to me, at least, to be as easy to send a message, to "say" something and to have it heard by all the participants, as it is to say something while seated around a conference table in a seminar room. Indeed, in some respects it was easier, because one did not have to worry about interrupting someone else or speaking out of turn. It also may have been more fruitful; this electronic "conference

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a famous passage, for example, Socrates is quoted as decrying the increased reliance on writing in Athens of the fifth century B.C.

> If men learn [writing], it will implant forgetfulness in their souls, they will cease to exercise memory because they rely on that which is written, calling things to remembrance no longer from within themselves but by means of external marks; what you have discovered is a recipe not for memory, but for reminder. And it is no true wisdom that you offer your disciples, but only its semblance; for by telling them of many things without teaching them you will make them seem to know much, while for the most part they know nothing; and as men filled not with wisdom, but the conceit of wisdom, they will be a burden to their fellows.

PLATO, PHAEDRUS 275a (R. Hackforth tr., 1952).

More to the point and in a phrase quoted less often, Socrates remarks that

> once a thing is put in writing, the composition, whatever it may be, drifts all over the place, getting into the hands not only of those who understand it, but equally of those who have no business with it; it doesn't know how to address the right people, and not address the wrong.

Id. at 275e; *see also* ERIC HAVELOCK, PREFACE TO PLATO (1963).

center" or cyberspace allowed the participants to be more reflective than would have been the case in a face to face conference.

The experiment suggested that networks would become an agent of change not because tasks could be completed more quickly, but because new opportunities would be opened up as constraints related to space and distance were eliminated. The institutional and social impact of such electronic communication becomes more comprehensible by focusing on relationships between people and between institutions that, because of spatial constraints, could not have existed in a print culture. Electronic communication does, of course, compress time, but what is most important or influential is that it also compresses space.

Obtaining information from a database or sending a message to a colleague across the country requires less time using electronic means than traditional means. Corporations that own databases or provide e-mail services are able to charge substantial fees that are justified by users on the basis of such time savings. Additionally, most software aimed at the legal market promises a like gain in efficiency.

The more significant and influential part of electronic communication, however, from an institutional and long term perspective, and one that should be looked at apart from any capability for reorienting time, is that data is accumulated or transferred at a distance in a very brief period of time; a machine thousands of miles away can be manipulated and used just as it would be if one were touching it directly. One sitting at a keyboard connected to a modem can not only send a message somewhere else but acquires capabilities that were previously available only if one actually were somewhere else. In this respect, "cyberspace supplants physical space,"[73] and the person searching for information online can and should be considered to be in a different environment from the person searching for information in a print library, even though the information each locates may be the same.

The time saving features of computers may only provide an illusion that legal traditions and practices are being handled more efficiently and that they are being strengthened.[74] As it fosters

73. Michael Heim, *The Erotic Ontology of Cyberspace*, *in* CYBERSPACE: FIRST STEPS 73 (1991).

74. The relationship between automation, computers and efficiency is often ambiguous because computers do much more than automate. Looked at in this manner, automation may

suggest too much of a closed system. Bringing information technology

new relationships between both people and information, cyberspace is likely to fuel a broad spectrum of change. The following analysis, therefore, provides a spatial equivalent to a "time frame," a perspective for seeing why new uses of space are pushing the law in new directions. Pressure for change occurs each time that an electronic message is used in place of some other kind of message or, even more importantly, each time that an electronic message is sent when one would not have been sent previously. Both the individual's and the profession's orientation toward space and distance is reoriented in some way. At some point the cumulative effect of this will become quite apparent, as will changes in who the lawyer is and what law is.

The process of change that will occur as spatial constraints affecting the structure, organization and practice of law are relaxed, is not something that can be easily measured or monitored. It requires us to look at law not simply as a set of rules or as a group of persons who provide a service, but as an institution that can be understood in spatial terms and as an institution that has, over time, adjusted to traditional spatial constraints in a variety of ways. It requires us to look not at the reasons why lawyers or legal institutions are adopting some technology but at what actually happens to the individual and the institution when the technology is used. One should focus attention, in other words, not simply on whether the needs of the purchasers or users have been met, because that may only reveal changes in the "bottom line" and whether or not the technology will continue to be used. Instead, one should focus on whether the purchaser's behavior

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> into an arena, even with the purpose of automating some process, tends not to have a confining or limiting effect but, instead, to be revealing and to open up the system. The reason for this is not really hard to find. This is that information technologies invariably generate information as they do their work and the information that is generated does not stay put or simply feed back in a perpetual loop, but is put to some use because it is now in a form that is easily usable and often even valuable.
>
> Information technologies, if it is possible to generalize about them, are typically not a good means to compartmentalize operations or to exercise rigid control because the technology that regulates the flow of information is, at the same time, creating information. Someone will want that information. Much of this information will escape, either by design or by accident, and it escapes because it is in a form that is easily used, easily copied, easily analyzed, easily manipulated, easily combined with other data.

M. Ethan Katsh, *The Law Librarian As Paratrooper*, 83 LAW LIB. J. 627, 628 (1991). For an interesting analysis of this process, which the author designates as "informating" rather than "automating," see SHOSHANNA ZUBOFF, IN THE AGE OF THE SMART MACHINE 10 (1988).

changes, whether new relationships are formed, whether there is access to and use of new and different kinds of information and whether patterns of interaction change.

The kind of spatial focus that provides a foundation for understanding future changes in law has two elements, one that concerns actual physical distances and one that considers a different kind of distance. This kind of difference relates to access, use and presentation of information and how these activities are affected by the nature of the medium of communication one is employing. The following section briefly discusses constraints of physical distance and informational distance that are inherent in a print culture. This discussion provides background for a consideration of the kinds of changes that are likely as law feels the effects of a process of information acquisition and distribution that is considerably different from what currently exists.

1. *Physical Distance*

For those using a computer that is linked to a network of some kind, it is no longer always necessary to go somewhere to obtain information or to work with someone. As Michael Benedikt has observed, it is now possible to "wander the earth and never leave home."[75] Distance is no longer an impediment to the formation and maintenance of personal and business relationships nor is it an impediment to the acquisition of information. The new media allow one to interact with persons in ways that were not possible when distance prevented the formation of a working relationship. Electronic communication still does not allow a user to literally "reach out and touch someone," as the telephone company has advertised, but it does allow relationships to form that were not possible before when distance prevented, or sharply limited, the sharing and communicating of information. As the spatial barriers to information flow fall, it becomes possible to reach out and work with someone or provide a service to and interact with others. There is a potential impact on any person or institution for whom the distribution, selling, or processing of information is part of some relationship. Such activities no longer take place in the same context they did previously because, as will be explained below, one can interact with others in new ways. It may be debatable whether highly personal relationships can be established at a distance[76] but it should not

75. Benedikt, *supra* note 22, at 14.

76. Lindsy Van Gelder, *The Strange Case of the Electronic Lover*, *in* COMPUTER-

be difficult to recognize that many new and different kinds of business and legal relationships will occur because of the new capabilities to communicate.[77]

The new media not only connect people with other people who are located at a distance, but they connect people with distant information. For example, electronic libraries containing enormous collections are accessible without getting up from one's desk. With portable computers, such sources of information will eventually be available from airplanes or from the tops of mountains. For reasons that I shall explain below, eventually we may speak not of having access to electronic information but simply of having the information. We will refer to physically distant electronic information in the same way we now refer to material that is on a shelf in our home, in a book in the library or in a file on our office computer.[78]

IZATION AND CONTROVERSY 364-75 (Charles Dunlop & Rob Kline, eds., 1991); *see also* Clare Collins, *Friendships Built On Bytes and Fibers*, N.Y. TIMES, Jan. 5, 1992 § 1, at 32; Michael Freitag, *As Computer Bulletin Boards Grow, If It's Out There, It's Posted Here*, N.Y. TIMES, Apr. 2, 1992, § 1, at 38.

77. The new technologies obviously have already affected the ability of firms to coordinate activities in different cities and countries. A recent paper by Villanova Law School student, Martin Lessner, goes further by raising questions about new alternatives to law firms. He asks:

> [W]hat is the best governing structure, i.e., organizational structure, for the practice of law? Options range from a traditional law firm to a market structure where lawyers practice independently and cooperate with each other only on a task by task basis. Computer technology lowers the transaction costs of working with attorneys of the market, thus providing a lawyer with an attractive alternative to the traditional law firm organization. The advantages of the market include quality as well as cost. Rather than relying solely on affiliate partners and associates in a firm, a lawyer can treat every fellow lawyer in the country as a potential partner. Why should a lawyer commit his efforts exclusively to one firm when it is more efficient (and profitable) to work with fellow lawyers only on an "as needed" basis?

Martin Lessner, *Information Technology and the Legal Product: Wither the Law Firm and Welcome the Market?* (unpublished work, on file with *Villanova Law Review*).

78. Our language of possession and of property reflects a variety of concerns. Possession is not synonymous with ownership. One can "have" something but not own it. Even if one owns something, there can be limitations on what one may do with one's copy, such as those imposed by the copyright laws. Ambiguity exists because language attempts to take into account both law and reality. Reality, however, is changing. A copy of Shakespeare's works may be on a shelf in my library, on a cd-rom or in database at Dartmouth College accessible via the Internet. At some point, each of these sources are equally accessible, whether or not I own or possess or have access to them.

A recent exchange on the law-lib list on the Internet suggests that this can go beyond being a hypothetical issue. One contributor asked how statistics were compiled concerning the holdings of libraries. It is relatively easy to count the number of books in a library but counting serials and electronic materials is more difficult. Current guidelines of the Association of American Law Librari-

Distance thus becomes less of an obstacle to both dealing with people and dealing with information; consequently, distance-related constraints on providing or obtaining services are much less of a problem. Although you may not yet be able to "access the Library of Congress from your desk,"[79] the amount of material so accessible is quite large and growing rapidly. Those who previously had the ability to restrict access to certain information, or benefitted in some way from the fact that people and the information they needed were in different places, or that information was available only in one place, find themselves vulnerable to change. Both working relationships and informational relationships can be expected to change as spatial barriers that limited communication between individuals, between practitioners and teachers, between lawyers and clients, between courts and lawyers and between citizens and the government, begin to fall.

2. *Informational Distance*

As just noted, the new media allow new kinds of interactions between people separated by distance and also allow information to be acquired and distributed in new ways. It is much less clear, however, how the new technologies touch information and people who are separated by a different kind of distance. Communications theorist Joshua Meyrowitz has pointed out that people can be physically close to some information and yet not have access to

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ans and the American Bar Association prohibit counting materials that do not appear as separate items in the library catalogue. This prohibits a library from including in its holdings all the files on WESTLAW or LEXIS that are accessible from its computers. Some libraries have attempted to do this. In addition, this violates norms and expectations existing in print culture. This is an issue, however, that will continue to surface in different ways as libraries rely on more diverse and remote sources of electronic information.

79. *Hearings on S. 1067, the National High-Performance Computer Technology Act of 1989, Before the Subcommittee on Science, Technology, and Space of the Senate Committee on Commerce, Science, and Transportation of the United States Senate*, 101st Cong., 1st Sess. 399 (1989) (testimony of Sheryl Handler) (noting that "[t]he information age will not be here until you can access the Library of Congress from your desk"). Some material from the Library of Congress is already accessible electronically. Two methods for doing this are to use FTP to SEQ1.LOC.GOV and to retrieve files located there, or to telnet to the Cornell Law School Gopher server (telnet to fatty.law.cornell.edu, login as gopher and then pick Library of Congress from one of the menus). Consider also the following:

> Today AT&T sends information between Chicago and the East Coast at the rate of 6.6 gigabits (the equivalent of a thousand books) per second. At this pace, the entire Library of Congress could be dispatched in twenty-four hours: Using conventional copper wire and a 2,400 baud modem it would take two thousand years.

WALTER WRISTON, THE TWILIGHT OF SOVEREIGNTY 21 (1992).

it.[80] In such instances, information is not under lock and key but it is in a form that is difficult to retrieve, use or understand. Such information is encoded not by sophisticated cryptographic methods but by the use of professional languages or by the use of some medium that requires special skills that only a few may possess.

Informational distance refers to how inaccessible a medium makes information. The medium may be difficult to use or the information may be presented in a difficult to understand format. Consequently, some information may be less accessible than other information not because it is far away or because it is conceptually complex but because of inherent qualities of the medium in which it is organized and stored. For example, Meyrowitz notes that "any writing system is more selective and exclusive than spoken language."[81] Further, he argues:

> Throughout history, the vessels in which ideas have been stored have come to be seen as the shape of knowledge itself. Yet to understand the impact of new media, we need to be able to distinguish between the inherent complexity of specific ideas and processes and the superimposed complexity of the means through which we encode and describe them. It is conceivable, for example, that if the only way people learned to tie their shoelaces was through descriptions in print, tying shoelaces might be viewed as a skill that was 'naturally' restricted to the highly educated.[82]

Law is, of course, inherently more complex than tying shoelaces. As will be explained below, access to and use of legal information, or at least some kinds of legal information, may be difficult not simply because of its complexity but because of the skills necessary to find and use the information in printed form—because of complexity of form, not because of complexity of content.

Because media may create barriers to information flow that are as significant and as impenetrable as physical barriers, it is necessary, in any discussion of the effects of communications technology, to be aware of how different media change modes of access to, and use of, information. Meyrowitz points out that

80. JOSHUA MEYROWITZ, NO SENSE OF PLACE (1985).
81. *Id.* at 75.
82. *Id.* at 79.

"media, like physical places, include and exclude participants. Media, like walls and windows, can hide and they can reveal. Media can create a sense of sharing and belonging or a feeling of exclusion and isolation."[83] For this reason, he suggests that

> physical settings and media 'settings' are part of a continuum rather than a dichotomy. Places and media both foster set patterns of interactions among people, set patterns of social information flow.
>
> Thus, while places create one type of information-system—the live encounter—there are many other types of situations created by other channels of communication. This wider view of situations as information-systems, rather than as places, is especially relevant to the study of electronic media because electronic media have tended to diminish the differences between live and mediated interaction. The speech and appearance of others are now accessible without being in the same physical location. The widespread use of electronic media leads to many new social situations.[84]

Informational distances and media settings are particularly relevant to the study of professions because a professional, by definition, controls a body of knowledge. When access to information requires special skills and informational distances become greater, institutional roles become more distinct and professional authority grows.[85] Conversely, professional authority tends to decline when informational distances are smaller. The status and authority of law and lawyers, therefore, is related not simply to what they do but to what they know. The status is related to how distinct the information they posses and control is from generally accessible information.[86] It is related, for example, not only to the physical separation of law libraries from other libraries but to the distance created by legal language, by digests, by key numbers and by other keys to the storehouse of legal information. As new links to legal information develop, change will occur that affects the law but that is largely unrelated to the content of the information. The role, authority and domain of the lawyer becomes vul-

83. *Id.* at 7.

84. *Id.* at 38.

85. Teun A. Van Dijk, *Structures of Discourse and Structures of Power*, 12 COMM. YRBK. 18 (1988).

86. KATSH, *supra* note 13, at 198-226.

nerable as the "distance" that exists between law and citizen, between the lawyer and lay person and between legal and non-legal bodies of information narrows.

III. LAW AND CYBERSPACE

> "In the long run, adoption of information technologies will blur the boundaries between citizen and agency and between agency and court. Blurring of these boundaries may necessitate rethinking the definitions of some of the basic events that define the administrative process, public participation and judicial review."[87]

By opening up new possibilities for interacting with people and information, electronic communication changes our perspective on both physical and informational distance. Many constraints limiting interpersonal and informational relationships will be removed as the law and the legal profession gradually adapt to the new communications environment. This does not necessarily mean that the new environment or the new technologies will be accepted eagerly, rapidly or uniformly. Institutional change does not occur at the same rate as technological change and there are considerable pressures on the profession to resist change.

Lawyers are comfortable with traditional ways of obtaining and processing information and have spent much of their professional lives adapting to and successfully exploiting the constraints of physical and informational space imposed by print. The new media require that one not only learn how to use new tools and employ new skills but they contain challenges to traditional concepts, orientations and habits of work. The rewards, or even the need, of immersing oneself in the new electronic environment will probably be less clear to many individuals than the very apparent difficulties of acquiring new skills, and of using machines that are relatively costly, are still not used by everyone and are not nearly as powerful in their infancy as they will be when they mature.[88] In addition, some spatial cornerstones of law, such as courthouses and libraries, are, often in a literal sense, carved in stone. There is pressure being exerted on what occurs in their edifices, but their physical prominence alone causes change to occur more slowly.

87. Perritt, *supra* note 41, at 105.

88. Ronald W. Staudt, *An Essay On Electronic Casebooks: My Pursuit of the Paperless Chase*, CHICAGO-KENT L. REV. (forthcoming).

We are still in an early stage of electronic communication; the networks we can see and use, while miraculous in some ways, are fairly primitive in others. Most individuals are still content with computers that have no, or very limited, communicative capabilities. While an increasing number of lawyers are using computers, few perceive the new technology as a necessary instrument for establishing new relationships with people or with information. We are, as I have argued, still obsessed with time, but rather blind to issues of space. Yet, even in this early period, one can try to apply a "space frame," a spatial orientation, that at least suggests the direction of change and allows us to understand why change in some areas is occurring faster than in others. Most importantly, the following analysis is designed to show that electronic networks are not simply pathways that move data faster and more efficiently. Electronic networks also bring new ways of thinking, disturb old habits and, as a consequence, require us to confront basic concerns of the law.

The main value of using a spatial perspective to explore the impact of the new technologies is that it highlights and clarifies the differences between the print environment and the electronic environment while providing a means for understanding why change is taking place. Viewed in such terms, the process of adapting to the new media has similarities to coming to terms with an alien environment or culture. In both situations, one needs not only to learn some discrete skills but to become sensitive to a new range of possibilities and a new set of appropriate attitudes and behaviors.

The concept of an environment should be familiar to all computer users. Every computer comes with software that defines an operating "system" or operating "environment." Software designers understand that one aspect of their role is to create a user friendly "look and feel" that provides functional capabilities in tandem with an effective and even inviting mode to use these capabilities. Indeed, as the commonly used "desktop" metaphor suggests, designers view the electronic environment as having at least some qualities in common with a familiar workspace.[89] Yet,

89. As will be described below in connection with applying the term "library" to electronic databases, some of the frequently employed metaphors are more confusing than illuminating. One commentator, for example, has criticized the

> 'desktop metaphor,' that opening screen jumble which is widely thought at the present time to be useful. . . . Why is this curious clutter called a desktop; we have to tell the beginner *how* it looks like a desktop, since it doesn't (it might as easily be called the Tablecloth or the Graf-

as one designer has noted, "[d]esigning human-computer experience isn't about building a better desktop, it's about creating imaginary worlds that have a special relationship to reality—worlds in which we can extend, amplify, and enrich our own capacities to think, feel and act."[90] As will be discussed below, it is important to understand this view of software. Software structures the nature of the electronic environment, shapes what cyberspace looks like and defines the user's constraints and opportunities. Interaction between software and hardware creates an environment that tells the user what is possible and what is not, and as such limits are understood and obeyed, it frames the kinds of activities that are undertaken and the role that is performed.

Figure 5 is intended not as an objective, precise or drawn-to-

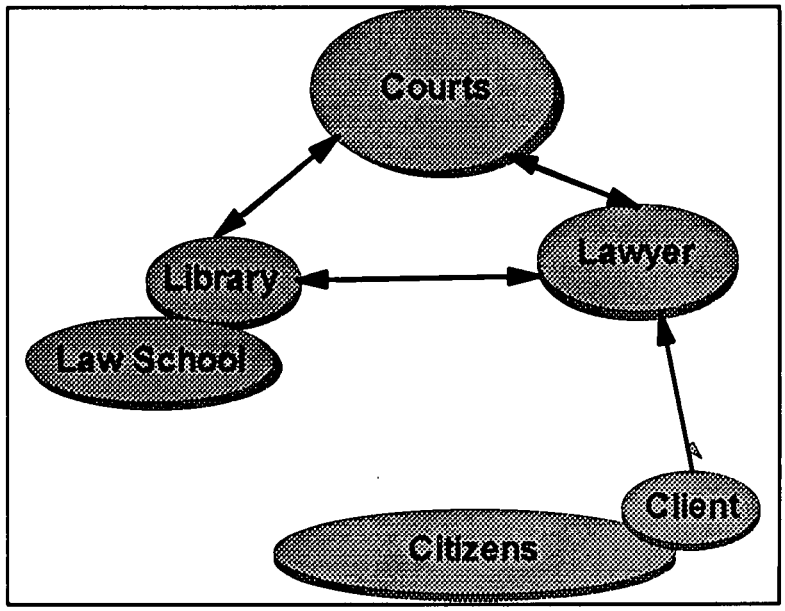

Figure 5

scale map. It is a model, a visual device that suggests one way in which a new medium can have an impact on law that is under-

fitti Wall). . . . We are told to believe that this is a 'metaphor' for a 'desktop.' But I have never personally seen a desktop where pointing at a lower piece of paper makes it jump to the top, or where placing a sheet of paper on top of a file folder caused the folder to gobble it up; I do not believe such desks exist; and I do not think I would want one if it did.

Theodor Holm Nelson, *The Right Way To Think About Software Design*, *in* THE ART OF HUMAN-COMPUTER INTERFACE DESIGN (B. Laurel, ed., 1990).

90. BRENDA LAUREL, COMPUTERS AS THEATRE 32-33 (1991).

standable in spatial or environmental terms. It is a macro-level sketch of some of the elements of our legal system as they have come to function in the print environment. Each of these elements has a fairly well-defined role and position in the legal process, and coordinated communication occurs among at least some of these components. In visual terms, each of the elements is separated from one another and some elements are also closer, in both a physical and informational sense, to each other than to others. These elements of law do not merely exist, but they exist in a relationship to each other. The lawyer, for example, stands closer to the court than does the client. The lawyer also stands between client and the court. As result, the courts may speak to citizens, but they do so at a considerable distance.

The lack of links between some elements and the distance separating the elements both signify something. For example, the distance between elements generally enhances the legal profession's identity and independence. As we consider possible areas of change in the new electronic environment, this visual portrait can be expected to change. Will the elements currently in the diagram be as prominent in the new environment? Do new patterns of communication arise that affect the distance between the elements and the relationship between elements? Do new entities, currently outside the boundary of this universe, move inside the boundary?

In addition to looking at the legal space as a whole, each of the elements might be considered individually as a separate environment. Within each element there are organizational structures and processes that reflect physical and information distance. Within each element there are distinct modes of interacting with people and information. In each context, one can ask both what kinds of constraints may be lifted as electronic forms of communication are employed and how difficult it will be to maintain barriers and boundaries.

The following section applies some of these concerns to one of the elements, the law library. In the law library, the effects of print culture are most obvious and the traditions of print are most profound. The law library is also a place where one of the earliest uses of computers in law occurred and where technological innovation may be at its highest. It is, therefore, an intriguing setting for trying to understand, more clearly than we do now, what the impact of electronic networks will be on legal roles and relationships with information.

1. *An Example: Law Libraries and Legal Research*

> The impact of LEXIS and WESTLAW is not simply a matter of a new technology simplifying or speeding up a preexisting process; it involves a change in the structure of legal literature. . . . [I]t seems clear that in law, more than any other discipline, the structure of the literature implies the structure of the enterprise itself.[91]

The earliest and, perhaps, the most familiar use of electronic communication by the legal community involves electronic legal research. The emergence of LEXIS in the early 1970s and of WESTLAW several years later enabled lawyers and law students to obtain legal information very quickly from the LEXIS database in Ohio or the West database in Minnesota.[92] Both companies promote their services as significant time savers.[93] Although costs continue to be high, the companies both argue, with some validity, that after factoring in the amount of lawyer and librarian time that is saved, this mode of research can be cost-effective.

While the value of LEXIS and WESTLAW is debated in terms of economics or quality of research,[94] this debate does not provide much insight into the long term impact of electronic information resources. If libraries are looked at as environments or spaces, however, one can begin to see why the effects of electronic information acquisition go beyond economic issues and research quality. The focus of concern becomes not only who has access to legal information and who can control legal information, but what role legal information plays and even how legal information is defined and categorized.

By stressing the differences between the print and electronic environments, I do not mean to suggest or predict the end of the

91. Robert C. Berring, *Full-Text Databases and Legal Research: Backing Into The Future*, 1 HIGH TECH. L.J. 27, 29 (1986).

92. William G. Harrington, *A Brief History of Computer-Assisted Legal Research*, 77 LAW LIB. J. 543 (1984); (stating that although computerized research has been available for twenty years, today, it is necessity); Jill Abramson et al., *West Publishing: The Empire's New Clothes*, 12 STUD. LAW. 17 (Jan. 1984).

93. A typical advertisement is one by LEXIS with the headline: "*In Law Practice Today, It's Always The Eleventh Hour: With LEXIS, You Can Make It Ten O'clock.*" ABA JOURNAL 9 (1992).

94. *See* Scott F. Burson, *A Reconstruction of Thamus: Comments on the Evaluation of Legal Information Retrieval Systems*, 79 LAW LIB. J. 133 (1987); Daniel Dabney, *The Curse of Thamus: An Analysis of Full-Text Legal Document Retrieval*, 78 LAW LIB. J. 5 (1986); Jo McDermott, *Another Analysis of Full-Text Document Retrieval*, 78 LAW LIB. J. 337 (1986); Craig E. Runde & William H. Lindberg, *The Curse of Thamus: A Response*, 78 LAW LIB. J. 345 (1986).

print library. It does seem clear, however, that we will see substantial growth in the use of electronic research techniques and electronically acquired information. We will have access to increasing numbers of databases, through networks and at speeds that do not exist today, utilizing search and data retrieval programs not yet on the market. Additionally, we will have to deal with increasing amounts of data that exists only in electronic form.

There is one reason, above any other, why electronic research techniques and demand for information in electronic form will continue to grow. Data in electronic form can be used so much more easily and for so many more purposes than can data in print. Data in electronic form is reusable almost instantaneously, can be combined with other data and can be edited, copied, communicated to and worked on with others. Value can be added to information in many more ways using electronic tools.[95] Print collections will not disappear, but the extent to which print versions of electronic material are maintained will certainly change. These changes can be expected to cause some controversy and generate some access problems. As more materials become accessible only in electronic form, however, the legal profession will be forced to come to terms with the new technologies and the new environment.[96]

A law library is not merely an entity with links to the profession and to other elements in the legal process, but is itself a spatial setting, an environment. For example, print law libraries are almost invariably architecturally impressive spaces.[97] They are also typically quiet spaces: spaces where individuals, rather than groups, are likely to be at work. In the library, everything is cate-

95. Perritt, *supra* note 54, at 344-401.

96. David R. Johnson, *A New Era: All Your Expertise in a Database*, 4 COMPUTER COUNSEL 1 (1992).

97. Professor Peter Martin has described the nature of law library space as follows:

> Just as the information resource denominated "library" presumes a community of interest, it also creates communal space. Indeed, there is no space more sacred in my school than the reading room of the law library. Often, and not just when raising money from nostalgic alumni, we speak of it as the heart of the school, a laboratory for students and faculty. The location of faculty offices in close proximity to the library collection was a critical design element in our recent building program. In truth, the library *has* been the law school's laboratory, shared by faculty and students, offering resources that students use side-by-side and see their faculty using.

Martin, *supra* note 70, at 641.

gorized, materials in each category are located near each other, and every item is assigned a particular space. Within categories, various methods of organization are employed so that access and use is possible. Most library materials are physical objects that can be used only by one person at a time. Librarians, experts in the nature and use of these materials, systematically organize the collections and, because they are physically located in the same space, assist users. Users must be familiar with the library's organizational structure as well as at least some of the ways that have been established to make the organizational structure accessible.

Print law libraries are invariably self-contained and physically separate from other libraries. In universities with law schools, the law library is located in the law school building apart from the general university library. The separateness of the law collection can be overcome by ordering a copy of some book that already exists in the general university collection, by ordering something through interlibrary loan or by going to another library. As a practical matter, however, physical separateness reinforces the informational distance that is created by the content and organization of any law collection. Law is a distinct enterprise not only because of the nature of law and the work that lawyers do but because the boundaries of law are reinforced by the manner in which legal materials are kept separate and by the spatial distance that one must overcome to encounter non-legal materials.

The physical separateness of the law library is matched by a fairly broad informational distance. A lay person wishing to find a particular court opinion, for example, has difficulty navigating the access route provided by digests, descriptive word indexes and key numbers. What appears to most lawyers to be an efficient and ingenious mode of access is a roadblock to the lay person. Consequently, what is arguably the most important part of the legal collection is also the part of the collection with the widest informational distance. This separation of the legal from the non-legal, through physical and other means, provides an extra measure of status and authority to the law and to those who work with it.

In contrast, lawyers, and perhaps even librarians, are less familiar with the electronic "library." This is a consequence not simply of the new skills one needs to learn in order to use the electronic space but of a whole series of what might be considered spatial or environmental differences. The electronic environment challenges our concepts of both physical and informational dis-

tance. Thus, to feel comfortable in such an environment, one needs not only to master particular skills but to adapt to an environment that plays by a very different set of spatial rules. Indeed, as I shall explain shortly, the spatial context is so different that it is highly problematic, perhaps even counterproductive, to even continue calling this environment a "library."

A. *Electronic Environments and Physical Distance*

Electronic sources of legal information are often thought about as simply being alternatives or supplements to print libraries. While these legal databases can be accessed from almost anywhere by any computer, it is still common to find law libraries with specially designated machines for either WESTLAW or LEXIS. This arrangement emphasizes the common thread between print and electronic collections: that material in one may resemble material in the other and that those most skilled in using electronic collections are probably librarians. This arrangement also helps to conceal the fact that they are very different kinds of environments with the only similarity being that some material may overlap.

Although they have approximately twenty years of experience with online legal research, experts are still uncertain how to teach students to become competent online researchers. Most agree that many students do not have adequate skills.[98] Yet, part of the problem is in only looking at skills and not looking at the environment in which those skills will be used. In teaching traditional library skills, one is able to assume that the student has had experience with the print environment. The instructor need not, therefore, be very explicit about the rules governing the physical environment or the relationship of physical laws to the print library. The electronic environment, however, is a radically different kind of environment and, if the student does not possess an understanding of its special features, he or she will not thrive when exposed to it.

Consider, for example, the following environmental or spatial differences between the print library and the electronic information resource:

1. The print library is a physical place whereas the electronic library is not. Print libraries must obey physical laws; one is either in the library or one is not; a book is either available for use

98. Joan S. Howland & Nancy J. Lewis, *The Effectiveness of Law School Legal Research Training Programs*, 40 J. LEGAL EDUC. 381 (1990).

or is not. The physical structure housing the library does more than allow information to be stored in it. It also serves as the interface to the stored information. It provides certain cues to users and, in a subtle way, informs the user about the research task that is being undertaken.

A print user sees and even feels the progress that is made as a search for information proceeds. As one pulls books off of the shelves, looks in indexes and turns pages, one "gets closer" to the search objective. The print user also learns something about the organization of the field that is being researched. The whole digest model, as Professor Robert Berring has pointed out, establishes a framework for understanding law that is reinforced as one moves from one step of the process to the next.[99]

Electronic sources of information, at least at present, provide no visual feedback to the user that compares to that conveyed by the spatial configuration of the print library. The electronic sources tell the user how many "hits" there have been but almost nothing else. In WESTLAW, the initial directory screen employs a print metaphor; the user selects a page number in order to look at what files exist in a particular directory. However, going to one of these virtual pages cannot convey the same sense that one has when one picks up a book, which has a cover and a finite number of pages, and turns to a particular page. The user of the print library is in both an impressive and a somewhat informative space while the person who is logged on to an electronic library today is, for all intents and purposes, in a vacuum. It does not have to be this way and, as I shall explain below, it probably will not be this way for very much longer. At present, however, there are almost none of the cues presented to users of electronic sources that the architecture and design of libraries present to print users.

2. The user of the print library is rooted to one place. This may seem so obvious that it is not worthy of mention. The user of the electronic source of information, however, is not so rooted. Once one escapes the architecture of the print library by using electronic networks, one also is freed of the physical laws which normally limit mortal humans.

A user of an electronic collection is really in two places at once—in the place where the computer is located and in cyberspace, where the electronic library is located. After electronically entering Cyberspace, the user goes somewhere without actually

99. Berring, *supra* note 91, at 29 ("[T]he structure of the literature implies the structure of the [law].").

being there. Using an electronic database can be disorienting because the user receives little or no feedback about what is occurring and, more importantly, because illusions, events that seem to violate physical laws, occur routinely. The experience makes many users feel weightless and evokes in some the same feelings encountered in looking at an illusion or an Escher drawing.[100] The objects that one sees on screen seem to be the same as familiar physical objects. When one looks more closely, however, which unfortunately many do not, it becomes obvious that this is an illusion and that the electronic version of an object has properties not possessed, or lacks properties possessed by the physical object that it replaces. Thus, as one uses the electronic media, one finds sources of information that function in Cyberspace but could not function, or at least could not function the same way, in our physical world.

Consider, as just one example, the first screen of choices one encounters after one logs on to LEXIS. LEXIS labels the choices that appear in Figure 6 as "libraries." While this undoubtedly provides some comfort and familiarity to users today, labeling these sources of information as libraries is also problematic. To the unsophisticated searcher, it suggests that the different choices lead to different collections, to different bodies of information like the different collections in two print libraries. This can be confusing, however, particularly to new users, because an electronic database like LEXIS/NEXIS does not conform to the same physical laws as print libraries. Print libraries are organized around the physical fact that every copy of some work must be in some place and, indeed, can only be in one place. Every book is assigned one and only one call number. All the copies of a given work are under the same call number and are located in the same place in the library. Indeed, the call number indicates something about where the book will be located in any library.

LEXIS/NEXIS libraries operate by very different rules and to those who have been conditioned to the spatial constraints of print libraries, using LEXIS/NEXIS and all other electronic sources of information can be disorienting. Disorientation results from the the fact that the choices in Figure 6 do not really repre-

100. Sherry Turkle, when interviewing computer users, found that "Escher was a favorite among computer people before *Godel, Escher, Bach* captured a long-standing computer-culture aesthetic by making the point, well known to programmers, that Escher's prints of hands drawing each other or of stairs that continue to rise until they reach their starting point are recursive." SHERRY TURKLE, THE SECOND SELF: COMPUTERS AND THE HUMAN SPIRIT 220 (1984).

Figure 6
LEXIS Library Selection Screen

LIBRARIES — PAGE 1 of 2

Please TRANSMIT the NAME (only one) of the library you want to search. - For more information about a library, TRANSMIT its page (PG) number. - To see a list of additional libraries, press the NEXT PAGE key.

NAME	PG	NAME	PG	NAME	PG	NAME	PG	NAME	PG	NAME	PG	NAME	PG	NAME	PG
				LEXIS — US						PUBLIC		FINANCIAL		——NEXIS——	
GENFED	1	CODES	1	LEGIS	1	STATES	1	CITES	6	RECORDS		COMPNY	15	NEXIS	13
MEGA	1	HOTTOP	12							ASSETS	6	MERGER	15	BACKGR	13
				MILTRY	4	CORP	2	LAWREV	6	DOCKET	6	NAARS	15	BANKS	14
ADMRTY	2	FEDCOM	3	PATENT	4	EMPLOY	2	MARHUB	6	INCORP	6			CMPCOM	13
BANKNG	2	FEDSEC	3	PENBEN	4	HEALTH	3	LEXREF	6	LIENS	6	—INT'L—		CONSUM	13
BKRTCY	2	FEDTAX	3	PUBCON	4	INSRLW	3	ABA	6	VERDCT	9	WORLD	16	ENRGY	14
COPYRT	2	IMMIG	3	PUBHW	4	MEDMAL	3	BNA	6	—MEDIS—		ASIAPC	16	ENTERT	13
ENERGY	2	INTLAW	3	REALTY	4	PRLIAB	4	TAXRIA	6	GENMED	12	EUROPE	16	INSURE	13
ENVIRN	2	ITRADE	3	TRADE	5	STENV	4	TAXANA	6	MEDEX	12	MDEAFR	16	LEGNEW	14
ESTATE	2	LABOR	3	TRDMRK	5	STSEC	4	ALR	6	MEDLNE	12	NSAMER	16	MARKET	14
ETHICS	2	LEXPAT	3	TRANS	5	STTAX	4	—ASSISTS—				CANADA	16	PEOPLE	14
FAMILY	2	M&A	4	CAREER	6	UCC	5	PRACT	12	POLITICAL		TXTLNE	16	SPORTS	13
FEDSEN	3	MSTORT	5			UTILTY	5	GUIDE	12	CMPGN	14			TRAN	14
										EXEC	14				

sent different libraries in the sense that they are separate collections. Most closely resemble special exhibitions that one often finds in libraries in which different parts of a collection that relate to the theme of the exhibition are brought together. What LEXIS can do that print libraries cannot do is create an infinite number of such subgroups and combinations. A LEXIS library resembles this kind of exhibition because it organizes a part of the LEXIS/NEXIS collection topically.

A print law library must obey Newtonian laws. Thus, to create an exhibition and put materials on display that are located in different realms of the library, the materials must be removed from the places where they normally reside. Two or three concurrent exhibitions might cause a problem, therefore, if there were some overlap in the materials needed for the different exhibitions. In addition, materials included in an exhibition cannot be loaned to patrons unless the library owns more than one copy of the material.

LEXIS, WESTLAW and other databases do not need to grapple with this kind of constraint. They can organize and reorganize "libraries" many times because they are really only providing alternate routes of access to one or more files. They can provide as many "exhibitions" as they wish without affecting access to any files in the exhibition. Files in any LEXIS library are always "in" because nothing is ever checked out of the electronic "library." Everything is, in a sense, "on reserve" yet everything can also be "taken out."

Choosing the appropriate electronic "library" is more challenging than deciding whether to look for a book in one of two print libraries because the content of one electronic library may overlap with another. Indeed, to one who approaches LEXIS with a print orientation, the laws of physics appear to be violated because one object appears to exist in many different places. The New York Law Journal file, NYLAWJ, for example, appears in seven different libraries: Banking, Genfed, Legnew, NY, NEXIS, Realty and States. It also appears in various group files in each of these "libraries." That one file is in six or more places at the same time is, of course, an illusion. It is an illusion worth noting, however, because the apparent ability of the electronic media to escape physical laws presents users with many other similar kinds of illusions. Effective electronic research requires understanding, getting used to and adapting to such apparent illusions[101] and to

101. The greatest illusion, of course, is that there are letters and numbers

organizational structures that could not exist with physical objects.

3. The manner in which an electronic database appears to enlarge its collection by rerouting access to files and increasing the number of different "libraries" it contains is more than matched by the manner in which databases can grow instantaneously merely by establishing electronic links to other collections. It is easy to mistakenly assume that LEXIS and NEXIS make use of the same computer or share space in the same computer. That belief builds upon some notion that what is presented to us on screen as a single entity actually exists as a unit. In an electronic world, where space is conquered at electronic speed, what appears as a single entity will increasingly be many different entities linked together electronically. A LEXIS library on electronic media and law could, in theory, consist of several files, some of which are in the LEXIS computer in Ohio and some of which are located elsewhere. It would appear on the screen, however, as a single "library."

As noted earlier, WESTLAW does something similar through its arrangement with DIALOG, a large commercial database of general information. WESTLAW subscribers can access DIALOG from the WESTLAW menu and use it in a manner somewhat similar to how LEXIS subscribers use NEXIS. The link between WESTLAW and DIALOG is not as seamless as the link between LEXIS and NEXIS. What is important, however, is how practical it has become to offer users information that can come from locations of which the user may be unaware of. Most of the menu

on the screen, at least letters and numbers that are the same as letters and numbers on a written paper. Using the keyboard or providing input in some other way involves manipulating electrical impulses. Pressing the key for "A" on the keyboard sends a different electrical pattern than pressing the letter "B" and causes a different set of lights to flicker on the screen. Is the user when he or she presses keys on the keyboard "typing letters" or is one turning on different patterns of electrical impulses? The flexibility inherent in the computer derives from the fact that there are no tangible images that might have to be erased, only electrical impulses that might need to be changed. We typically move past this illusion very quickly although it does occasionally trouble some new users. I was once told by a new user, for example, that he was having difficulty adjusting to the fact that pressing the spacebar on the keyboard caused the letters on the screen to move. This contradicted his experience with a typewriter where pressing the spacebar caused the carriage or typing ball to move and where, of course, letters on the paper could not move from place to place.

What is not an illusion is the continuing shrinkage in the amount of space required to store information. In July, 1992, for example, a Bell Labs team reported that it had fit 45 billion bits (45 gigabits) of data into one square inch. It was claimed that two copies of *War and Peace* could be stored in an area the size of a pinhead. Elizabeth Corcoran, *Storage Space*, SCI. AM., Oct. 1992, at 110.

choices, for example, on the Cornell Law School's Legal Information Institute computer and the Washington and Lee Law School "gopher" provide access to information stored elsewhere in this and other countries. Making a selection from the menu on the screen automatically places one in a different computer located somewhere else. There is, therefore, almost no limit to the size of "collections" linked together in seamless fashion.[102]

The seamless linking of scattered computers in order to permit access to information contrasts with the non-seamless linking of libraries in the print world. Linking exists in print libraries under the guise of "interlibrary loan." Spatially separate institutions cooperate to supplement each others' collections. Electronic interlibrary loan is fundamentally different, however, because the conquering of space makes the process neither "interlibrary" nor a "loan." Multiple sources of information merge into one source; one does not even feel that one is consulting multiple sources. In addition, there are no "loans" in the electronic universe; what appears on the computer screen is a copy, which may be kept and stored or discarded from memory. Unlike the print environment, where a library never has its whole collection physically in the library, because part of every lending library is always on loan, everything in the electronic library is always "in." Nothing is ever removed from the library by patrons.[103]

4. Because of physical space limitations in print libraries, li-

102. *See* DAVID GELERNTER, MIRROR WORLDS 73 (1991) ("One computer can only be so fast but the aggregate power of a *group* of computers is limited only by the size of the group."); *see also* W. Daniel Hillis, *What is Massively Parallel Computing, and Why Is It Important?*, *in* DAEDALUS 1 (1990).

103. Interestingly, material is often removed from databases by its owners. New electronic information often "replaces" old information. In contrast, in the print library it is common for new information or new editions to "join" old information. The electronic medium, therefore, may be placing a lower value on prior editions of a work than does print. This may simply be a consequence of the ease with which electronic information can be deleted. It may also reflect a difference in how information in tangible form is valued.

A more troublesome problem with distributed computing may arise because, at times, only one copy of the work exists. It is, after all, unnecessary for a database to have its own copy of something if the database has access to the computer where the material is located. In theory, a computer could provide only links to other computers and store none of the information that it provides to users. A potential problem with this is that if the only copy is removed for some reason, everyone loses access to it. An example of this has occurred with Professor Peter Martin's treatise on social security law. This was the first electronic treatise and appeared on LEXIS. LEXIS has recently removed the treatise from its offerings and, until the material is made accessible elsewhere through LEXIS again or some other medium, the treatise is not merely "out of print," it is out of circulation.

brarians must decide what materials will occupy the available physical space. This raises the premium on both the quality and the relevance of the stored material. If physical space is limited, higher quality and more relevant materials will get preference over lower quality and less relevant materials, and, in a law library, materials related to law will receive preference over materials related to some other field. It is natural, therefore, in an era of print collections, to have libraries devoted to specialized fields. Also, for efficient access, the physical space must be organized. The physical arrangement of different specialized collections has reinforced epistemological boundaries between disciplines and collections. For law, it focuses attention of users on materials the profession considers necessary and makes it less likely that attention will be directed towards non-legal literature.

The "librarians" of electronic space are under less pressure to organize their collections. As a result, when print models of organization are applied in the electronic environment they may even appear arbitrary and constraining. During most of the 1980s, for example, law schools did not have the same access to NEXIS that they had to LEXIS. During this period there was a clear division between electronic law and non-law materials, much as the distinction exists in the print realm between legal and non-legal libraries. The attention of law students was as focused on legal materials as it had always been. The decision to provide access to NEXIS may have been a competitive action by the Mead Data Corporation but there was also a technological imperative behind it. With space no longer a constraint, the lack of access to non-law materials that are part of the same collection becomes harder to justify. Eventually, it will be understood that one connected to cyberspace is no longer really in a law library but in an environment that can be organized by the user to fit his or her needs. The screen in Figure 6, therefore, not only tells us what choices are now available on a particular service but is a look into the future in the sense that our categories of organizing data, and law, are shifting and expanding as we become more reliant on information in electronic form.

The qualities of information in Cyberspace are not self-evident, and superficial similarities with print libraries often mask these qualities. A professor of architecture, Michael Benedikt, who, because of his training, is probably more sensitive than most to the nature of physical space, has recognized these qualities. Benedikt writes that in Cyberspace,

> the principles of ordinary space and time, can, in principle, be violated with impunity. After all, the ancient worlds of magic, myth, and legend to which cyberspace is heir, as well as the modern worlds of fantasy fiction, movies, and cartoons, are replete with variations of logic of everyday space and time; disappearances, underworlds, phantoms, warp speed travel, mirrors and doors to alternate worlds, zero gravity, flattenings and reconstitutions, wormholes, scale inversions, and so on. And after all, why have cyberspace if we cannot (apparently) bend nature's rules there?[104]

Similarly, computer programmers understand that their creations allow them a degree of flexibility that traditional craftspersons do not enjoy. Sherry Turkle asked students learning programming "what are your favorite books and can you say why?"[105] One student's answer was particularly revealing: "Winning science fiction. In science fiction, you can start from scratch. It's like writing a program. Even in Logo programming, children can create worlds that operate by Aristotelian principles instead of Newtonian ones. No physical constraints. Make a whole new world with its own rules."[106]

As a result of the different kind of space that one finds himself or herself in when using electronic sources of information, the use of the word "library" to describe this space may be more confusing than illuminating. The word "library," when it was first used by LEXIS, may or may not have been assumed to fit the dictionary definition of a library and to be an appropriate use of the term. Given the great difference between electronic "libraries" and print libraries, however, I would suggest that it is necessary to begin to view the word "library" differently, to consider it as a metaphor rather than as a label—a device to encourage people to think about one object in terms of some other, more familiar, object. Yet, if one considers the word "library" in this manner, it is apparent that it is an inappropriate figure of speech because it misleads users about the nature of the space in which they are.

A metaphor is a "cognitive hook"[107] that can help a user to understand something unfamiliar by using terms related to something familiar. In this case, it has been assumed that applying the

104. Benedikt, *supra* note 22, at 128.
105. Turkle, *supra* note 100, at 222.
106. *Id.*
107. LAUREL, *supra* note 90, at 128 (introducing this expression).

term "library" can facilitate using the computer in lieu of the technology it is replacing, and can allay the anxieties of users. The reason for this is that metaphors and other figures of speech can shape how experience is conceptualized. Metaphors, commontators note, are

> pervasive in everyday life, not just in language but in thought and action. Our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature.
>
> The concepts that govern our thought are not just matters of the intellect. They also govern our everyday functioning, down to the most mundane details. Our concepts structure what we perceive, how we get around in the world, and how we relate to other people. Our conceptual system thus plays a central role in defining our everyday realities. If we are right in suggesting that our conceptual system is largely metaphorical, then the way we think, what we experience, and what we do every day is very much a matter of metaphor.[108]

A designer of software interfaces has expressed a similar view and noted that:

> A word that is used in a metaphorical way is just the tip of the iceberg. A metaphor is an invisible web of terms and associations that underlies the way we speak and think about a concept. It is this extended structure that makes metaphor such a powerful and essential part of our thinking. Metaphors function as natural models, allowing us to take our knowledge of familiar, concrete objects and experiences and use it to give structure to more abstract concepts.[109]

Metaphors can thus clarify, but they can also obscure. Lakoff and Johnson point out that "[i]n allowing us to focus on one aspect of a concept . . . a metaphorical concept can keep us from focusing on other aspects of the concept that are inconsistent with that metaphor."[110] This is the troubling aspect of using print metaphors to describe database functions. Because the

108. LAKOFF & JOHNSON, *supra* note 11, at 3.

109. Tom Erickson, *Working With Interface Metaphors*, *in* THE ART OF HUMAN-COMPUTER INTERFACE DESIGN 66 (B. Laurel ed., 1990).

110. *Id.* at 10.

electronic and print environments operate according to different rules, the use of print metaphors shapes the user's thinking in a way that is dysfunctional and that does not help the user become oriented to an electronic environment. Although some assume that "if the interface presents representations of real-world objects, people will naturally know what to do with them,"[111] the library metaphor actually provides little insight to the user because of the spatial differences.

One of the most perceptive analysts of the metaphor's role in helping or in hindering new computer users, Brenda Laurel, has pointed out a similar problem with a very common metaphor used in software—that of the "desktop." Laurel points out that there are

> two ways to fall off the desktop. One is when you start looking for other things that 'go' with it and you can't find them—filing cabinets, telephones, blotters for doodling and making notes or even an administrative assistant to make some calls or type some letter. The other way to fall off the desktop is to find something on it that doesn't go with everything else, thereby undermining or exploding the mimetic context—for example, a trash can that gobbles up your trash seemingly at random and ejects your disks.[112]

The novice electronic legal researcher might be considered to be in some kind of freefall as he or she tries to adapt to a "library" that lacks many of the gravitational forces that help one function in a print library. To stop this freefall, the user needs new types of support in addition to training in skills. This support may be in the nature of new metaphors,[113] and certainly includes new software that provides more feedback to the user[114]

111. LAUREL, *supra* note 90, at 128.

112. *Id.* at 131.

113. One piece of software, explaining how to use LEXIS to new users, employs, only partly in a tongue in cheek manner, a "sending out for pizza" metaphor. This metaphor suggests that electronic legal research might have more in common with the process of using the telephone to have an item delivered from a distance, e.g. pizza, than with going to the library. *See* M. ETHAN KATSH & THOMAS BRUCE, ROCK'N ROLL LEXIS: A HYPERACTIVE APPROACH TO ELECTRONIC LEGAL RESEARCH (1992).

114. In an important work about space and culture that touches many of the themes I have raised, Edward Hall notes:

> Man and his extensions constitute one interrelated system. It is a mistake of the greatest magnitude to act as though man were one thing and his house or his cities, his technology or his language were some-

and insight into what it feels like to experience the loss of gravity. In this regard, the analysis of Professor Robert Berring is particularly insightful because Berring uses spatial terms like "structure," "location," "situation," "context" and "setting" that implicitly recognize the importance of context. Berring writes:

> The full-text on-line legal databases are a new form of legal literature. The new literature is more or less identical in content to the old West system, but it is accessible in an entirely new way. If we concentrate on the question of access to the case law, we can begin to understand how radically the legal databases break with the literature of the past. . . . The Digest was the internal, mediating structure within the old mode of discourse . . . the location of issues and cases in the old paradigm was part of their meaning. Because the cases were accessible through the Digest, they were always presented to the practitioner as situated. The situation was a substantive context, a setting that told the searcher the meaning of the case as much as it did the opinion itself.
>
> Free-text searching in legal databases, however, deprives the researcher of context.[115]

As the electronic culture matures, our language will eventually respond to the proliferation of informational contexts by providing us with more specialized and appropriate terms. Our language will then reflect the new kinds of informational spaces and imprecise or inaccurate metaphors will no longer have the same kind of influence on our thinking and perception that they have had for the last twenty years. As print related terms are used less often, the lens through which we view electronic space will put the novel qualities of Cyberspace into clearer focus. Assumptions that have been made as to who should control or organize Cyberspace will be reassessed.

Users will then see this new space not simply as an extension of the print world's impressive achievement, the library, but as an

---

thing else. Because of the interrelationship between man and his extensions, it behooves us to pay much more attention to what kinds of extensions we create . . . . Because extensions are numb (and often dumb, as well), it is necessary to build feedback (research) into them so that we can know what is happening, particularly in regard to extensions that mold or substitute for the natural environment.

EDWARD HALL, THE HIDDEN DIMENSION 177-78 (1969).

115. Berring, *supra* note 91, at 54.

extension of many different information sources that people use in daily life. Cyberspace can be considered to be as much an extension of one's personal library or of one's rolodex as it is of the law library. No single metaphor seems adequate because individuals are more able to shape the use of the network and to create it in their own image than was ever possible with the bricks and mortar needed to shape the physical spaces required in the print world.

B. *Electronic Environments and Informational Distance*

The electronic environment changes not only physical distance and external models of organizing information but also affects internal modes of thinking about information. The person interacting with a computer, particularly when this computer extends his or her access to information in ways that our language has difficulty describing, is engaged in a different kind of experience from the person who is interacting with a set of books in a print library. Admittedly, it is difficult to think of online sources of information as being anything but a substitute for books. Everything about the manner in which electronic databases have been presented to users suggests that they are, in all ways, merely alternatives to print materials.[116] One who employs a spatial context, however, sees the online environment more broadly as an environment that encourages different attitudes about, and new relationships with, information.

Informational distance relates to the manner in which information is used and to the tools and skills needed to access information. Through working with information in an electronic environment, the user experiences something quite different from that experienced in the print environment. The print experience involves not merely taking information off of a page, but understanding and using indexes, turning pages, being cognizant of the length of chapters and the weight of the book, being influenced and giving meaning to bold, underlined and other typefaces, and being aware that every other copy of the book that one is looking at is identical to it. It involves habits of learning, of reading and of implicit understandings of what can be done with

116. Although I have focussed on LEXIS "libraries," the print orientation is present in WESTLAW also. As mentioned earlier, to see the content of a directory, one must type in the "page" number of the directory. This is obviously a metaphor. Moreover, dividing the directory list into "pages" that have none of the "look and feel" of printed pages, has questionable value.

information. Print users accept the fact that to pass on to others what one has read is not easy. Paraphrasing is not exact and hand copying, xeroxing or purchasing another copy of what is being read may be fairly cumbersome. The electronic media provide new means to work in a group and to share both what one reads as well as what one writes. Everything that is read or written can easily be forwarded and, as a consequence, begins to provide users with a new orientation toward the process of reading and using information.

Although Gutenberg printed the first book using moveable type in the West, he did not create the information environment of print. That environment emerged gradually as books became smaller and more manageable, as libraries grew and as new devices, such as indexes, title pages and new typefaces, became commonplace. Charles Goodrum has pointed out that it took a generation before a Venetian printer, Aldus Manutius, rejected the idea that

> a book had to look like a manuscript. He was convinced that the invention was being applied in the wrong direction. Instead of huge, wood-bound lectern folios, he believed a book should fit in a saddlebag so that it could be moved and read at leisure. He shrunk the pages, invented cardboard covers to be used instead of pine, decided that the Roman type would never squeeze together enough to make a hand-holdable volume so he invented italics which take up much less space yet retain their legibility.
>
> Finally, he was committed to making the book as beautiful a piece of hard print as the manuscript had been as a work of hand art. He designed clean, austere pages that have never been surpassed for their grace and visual harmony.[117]

Consequently, it should not be surprising if, at this time, the electronic environment has not yet adapted to and developed equivalent, or even more powerful, tools to reduce informational distance and to deal with the uniqueness of the online environment.

For several reasons, the online environment is likely to be an area of enormous change in the near future. First, almost any

117. CHARLES A. GOODRUM, TREASURES OF THE LIBRARY OF CONGRESS 63 (1991).

new personal computer sold today is many times more powerful than the average computer it is replacing. Second, almost any new modem sold today allows information to travel in and out of the computer at several times the rate of modems that were prevalent a few years ago. Third, looking ahead three or four years, transmission rates of NREN will be many times faster than transmission rates of the current Internet. Fourth, even before that, ISDN may allow for fast transmission rates over regular telephone lines.[118] The hardware that will comprise the electronic environment in the not too distant future, therefore, will, at the very least, bring information in at faster speeds than it does today.

Once this hardware is in place, the key influence on what the electronic environment looks like to users and on how one accesses and relates to electronic information is software.[119] Cyberspace is, in a sense, like any other space in that it can be redesigned and made more habitable. This is largely the role of software. Software allows and regulates interaction with the electronic environment. Software controls whether the mode of interaction is through words, through arcane commands, through a mouse that one can use to make a choice by pressing a button or, in the future, through the human voice. Software controls how much information is presented to the user and what the user is expected to know in order to successfully navigate through a computer located many miles away. Software is the guide, the architect and even the interior decorator of Cyberspace.[120]

The landscape of Cyberspace, therefore, is not pre-ordained. Its appearance changes not only as hardware changes, as words become easier to see on the screen, as color becomes popular or as speeds of transmitting and processing data increase. It also changes as new software appears that illuminates the space and provides feedback and guidance to users. Software builds on technological developments. It can be designed to allow and encourage the use of images when images are appropriate, to recognize mistakes and suggest solutions, to provide help to users, to

118. WILLIAM STALLINGS, ISDN: AN INTRODUCTION 8 (1989); Joanie Wexler, *Launch Links ISDN 'Islands,'* COMPUTERWORLD, Nov. 9, 1992, at 1.

119. *See* PAUL HECKEL, THE ELEMENTS OF FRIENDLY SOFTWARE DESIGN (1982) (describing key elements of software, its design and use); Theodor Holm Nelson, *The Right Way to Think About Software, in* THE ART OF HUMAN-COMPUTER INTERFACE DESIGN (B. Laurel, ed., 1990) (describing proper design of software).

120. Microsoft Windows software allows the user to change background colors with patterns it refers to as "wallpaper." This is an indication, albeit a relatively trivial one, of the role that software plays in designing electronic environments and relationships.

welcome users and to understand and anticipate the needs of users.[121] Software needs to exploit and to facilitate the use of the unique capabilities of the powerful hardware and to provide guidance to users who approach letters on the screen as if they were reading a printed book.

Communications software, thus far, has presented users with a rather sterile, uninviting and unhelpful environment.[122] The rapid advancement of computer hardware has overshadowed this unfriendliness.[123] The accessibility of remote information by electronic means, in however awkward or cumbersome a manner, still is impressive, perhaps even miraculous. In 1974, the first broadly advertised personal computer, the Altair, had no keyboard or means to connect to other computers. It was programmed using switches and provided feedback to the user not from a screen but from a panel of lights. Two decades, therefore, have brought quite extraordinary progress. Yet, there remain considerable difficulties in using online sources of information that are not inherent in the technology but are a consequence of software that developed in an earlier period and that does not exploit present capabilities or opportunities. As Mitch Kapor and Jerry Berman have written:

> "Transparency" is the holy grail of software designers. When a program is perfectly transparent, people forget about the fact that they are using a computer.

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121. A symbiotic relationship exists between software and hardware. Less powerful hardware, for example, cannot support a monitor that can rapidly show images and text together in many colors. If hardware supports only slow transmission rates, less incentive exists to transmit images because images take longer to transmit than text. As hardware becomes more powerful, however, software can be designed to take advantage of it. Software that puts images, text and even animated images on the screen can be a more effective communicator than text alone and can be a catalyst and motivator for increased use of the technology.

122. CHARLES MCCLURE ET AL., THE NATIONAL RESEARCH AND EDUCATION NETWORK: RESEARCH AND POLICY PERSPECTIVES 42 (1991).

123. William Harrington, who was involved with LEXIS at its earliest stage, recalls that:

> [S]earches typically ran five minutes, often twenty or thirty minutes, and sometimes more than an hour — and still the lawyers thought the system marvelously fast. One demonstration search, run on a terminal in a hotel suite in St. Louis during an ABA convention, ran four hours! Wilson and Harrington took the interested lawyer . . . to dinner, while the search was running, and it was not finished when they returned. Still, the lawyer was impressed with the efficiency of the system, which had found a case his firm had overlooked after weeks of conventional research.

Harrington, *supra* note 92, at 551.

> The mechanics of the program no longer intrude on their thoughts. The most successful computer programs are nearly always transparent . . . . Personal computer communications, by contrast, are practically opaque. Users must be aware of baud rates, parity, duplex, and file transfer protocols—all of which a reasonably designed network could handle for them. It's as if, every time you wanted to drive to the store, you had to open up the hood and adjust the sparkplugs. On most Internet systems, it's even worse; newcomers find themselves confronting what John Perry Barlow calls a "savage user interface." Messages bounce, conferencing commands are confusing, headers look like gibberish, none of it is documented, and nobody seems to care . . . . The network becomes needlessly exclusionary.[124]

If information distance is to be reduced, therefore, software is the key. Concerns over software will have to change "from *what* the software does to *how* it does it."[125]

The relatively familiar worlds of WESTLAW and LEXIS illustrate the relationship between informational distance and software. The electronic world, if one looks at it narrowly in terms of what information is needed to find something, might appear to reduce informational distance considerably. The user no longer needs to have knowledge of legal categories, indexes, digests or key numbers.[126] Users can find materials using words or combinations of words. Nothing would appear to erase informational distance as much as this, which speeds up searching and makes electronic searching a much easier task than print searching.

Unfortunately, word searching is not really very easy nor is it conceptually simple. For example, thinking up all appropriate words is not particularly easy and neither service provides an online thesaurus that might help users struggling to find appropriate words.[127] This, however, is only a small part of the problem.

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124. Mitchell Kapor & Jerry Berman, *Building the Open Road: The NREN as Testbed for the National Public Network*, *in* BUILDING INFORMATION INFRASTRUCTURE 199, 211 (Barry Kahin ed., 1992).

125. HECKEL, *supra* note 119, at 10.

126. An interesting examination of the West Digest and classification scheme is written by John Doyle, *WESTLAW and the American Digest Classification Scheme*, 84 LAW LIB. J. 229 (1992).

127. HENRY PERRITT, HOW TO PRACTICE LAW WITH COMPUTERS 260 (1988) (stating that computer research can be improved by more advanced

Even more importantly, what is necessary in order to conduct an effective word search is to arrange the words in a certain way. Whether one finds three cases or three hundred, or whether the number of relevant cases will be three out of five hundred found or three hundred out of five hundred found depends on whether words are linked by "and" or "or" or "within" or "not within," or whether the words are inside or outside of a set of parentheses. Even if companies provided legal databases cost-free to the general public, they might be relatively useless to lay people because the boolean scheme is difficult to master and there are considerable differences in the rules and conventions for searching different databases. While software could be redesigned to help searchers, this does not appear to be a very high priority of database vendors.[128] Nor, unfortunately, does the role software plays in structuring space seem to be recognized by those who study legal research methods, because there has been negligible discussion of software issues in debates over problems involved in teaching electronic legal research.

A user logged on to most commercial databases today is physically close to relevant material but informationally distant from it. This is even more true of the individual who is interested in finding information on sources linked to the Internet. Such a person may receive e-mail but probably feels awkward about looking in FTP sites for information, or is completely unaware of them.[129] There are rapidly increasing sources of highly useful information on the Internet but the tools for using them, or even being aware of them, are at a rather primitive level. This will, of course, change and, as electronic space becomes more inviting, and as rates for using commercial sources decline, usage can be expected to increase rapidly and information distance will dimin-

"frontends"). The recently implemented WESTLAW natural language search process (WIN) includes a thesaurus.

128. An example of a design feature that is very helpful and illustrates an understanding of the needs of users is contained in WESTLAW'S Westmate for Windows software. While WESTLAW's DOS software and both versions of LEXIS software provide an essentially blank screen on which to type in a search, WESTLAW for Windows contains a list of the connectors on the screen. If the user is familiar with boolean searching but not familiar with WESTLAW's particular syntax, the user can choose a connector simply by clicking with a mouse. In other words, the software allows the user to employ connectors and limit searches without having to remember abbreviations or the order in which the connectors and key words must appear.

129. ED KROL, THE WHOLE INTERNET USER'S GUIDE & CATALOG 59-90 (1992).

ish. This has considerable implications for both citizens and lay people as well as for legal professionals.

1. *Relationships of non-professionals to legal information*

Control over a body of information is part of the definition of a profession.[130] Access to legal information in the print environment requires specialized training. Many feel that the legal profession's complex storage and retrieval techniques make lay people too dependent upon lawyers; the antidote consists of books and manuals that attempt to summarize various legal procedures in simple English.[131] With print, in other words, the only practical means for reducing informational distance between a citizen and the law was to create an alternative genre of literature that explains procedures and concepts in simpler language and that avoids traditional legal materials almost entirely.

There are no recent attempts to develop completely new methods of accessing print materials that might be easier to use than traditional search and retrieval methods. To attempt such a task would be a forbidding, if not impossible, undertaking. The new information technologies, however, do make it possible to break down informational distances in ways that were not possible or economical with print. In an electronic information environment, there will be a different distance between legal and non-legal information than there is in a print culture and there will also be a different distance between those who have controlled legal information in the past, the legal profession, and those who have not, clients and citizens. There are several reasons for this.

a. Electronic materials do not rely on print categories

As noted earlier, access to information typically occurs in a manner that is different in the electronic environment from what it is in the print environment. A key obstacle to access in the print environment is a lack of knowledge of the subject matter and of the manner in which the subject matter has been organized. With print, one ordinarily needs to know something about the subject matter in order to find out more about it. The knowledge threshold is much less in the electronic environment, however, and if there are difficulties in accessing electronic information, they are much less related to what one already knows, because words are

130. KATSH, *supra* note 13, at 198-226.

131. *Self-Help Guides on Law Grow Into Big Business*, N.Y. TIMES, Sept. 25, 1992, B16.

more important than categories in searching databases. What is currently a limiting factor that is more important than awareness of content and categories is the poor design of software.[132]

This is a significant point. Barriers to using print materials are, in a sense, inherent in the medium used to store information. The barriers currently standing in the way of or lending confusion to accessing electronic materials, however, are, to a considerable extent, a consequence of poor software design that will gradually be remedied. As computer scientist David Gelernter has asserted, "[t]he software revolution hasn't yet begun; but it will soon."[133] Many problems that are experienced in accessing electronic information, in other words, are software related rather than content related. Electronic research has some inherent problems, but it is also a process that is immature, evolving and not fixed. As software begins "to change more than any other element in the computer paradigm,"[134] the relationship between users and information will change as well.

WESTLAW's recent introduction of natural language searching is quite intriguing in this regard. WESTLAW made it available in October, 1992, shortly before this Article was completed and it is not possible at this time to know whether it will be found to be a generally acceptable substitute for boolean searching. The natural language option, called Westlaw is Natural (WIN), allows one to substitute questions in standard English for searches previously conducted using the boolean model. A WIN search will present the user with between 20 and 100 cases in a ranking order of relevance that is related to the number of times the main search terms occur in the documents found.

WIN is WESTLAW's second attempt to reduce the complexity of boolean searching. The first was EZACCESS, which helps unfamiliar searchers find material that has a word or combination of words in a case or document. While EZACCESS is easy and does provide access, the kind of access it provides is limited. One loses some of the flexibility provided by regular boolean search-

132. I do not want to minimize the inherent differences between searching with words and searching with categories and digests. There will be different results using print and electronic means, as others have pointed out. *See* Burson, *supra* note 94, at 133; Dabney, *supra* note 94; McDermott, *supra* note 94; Runde & Lindberg, *supra* note 94. What has not been pointed out is how much extra training and how much poor searching has occurred because inadequate attention has been paid to software.

133. GELERTNER, *supra* note 102, at 8.

134. Lawrence Teslet, *Networked Computing in the 1990s*, SCI. AM. 90 (1991).

ing and it is, therefore, essentially unusable and unreliable except for a quick and superficial look at some area by someone unfamiliar with the syntax required for a WESTLAW boolean search.[135] Indeed, persons who have difficulty remembering how to use "and," "or," "within," and other search connectors but who are generally familiar with the boolean model would probably find WESTLAW's WESTMATE for WINDOWS software an easier and more helpful alternative than EZACCESS.

As already noted, WIN may or may not be able to satisfy the needs of persons who are already capable of conducting boolean searches. It is an interesting development, however, because it is an alternative that moves users one more step away from the great informational distance inherent in print. No longer does one need to know legal categories and no longer does one need to remember arbitrary connectors that vary from database to database. What WIN does, or some descendant of WIN will do, is remove indexing methods (the roadblock of print) and computer language (boolean searching) as distance creating artifacts.

If WIN is successful, and as software becomes smarter and easier to use, the impact will be much wider than merely reducing confusion about electronic searching. Using the spatial perspective, one can view improved software as having the potential for reducing distance between those who need or desire legal information and the information that has traditionally been "distant" from them. WIN and other software improvements should be able to resolve the problem of different databases having different commands and rules for searching. One might use the same means to access legal information, medical information and financial information. Such an information system retains a role for professionals, such as lawyers, who work with relationships in a complex environment. The role, however, will be linked to the complexity of data and not to the complexity of access.[136]

Looked at in this way, what WIN has the potential for setting in motion may be less significant for members of the legal profession who have difficulty with the boolean system than it is for non-

135. By choosing the natural language approach available in EZACCESS, EZACCESS will become more functional.

136. Some have argued that lack of understanding of the content of legal databases will deter potential users who are not trained in the legal area. There is some truth to this. Well designed software, however, can provide assistance to users not trained in the legal field. Current software is almost universally abysmal in terms of informing any user, expert or novice, about what is in a particular database or file.

lawyers. The impact of WIN, in other words, may be on a group that was so distant from legal information that it did not even exist as a market. Non-lawyers can now move closer to law-related information in electronic form as WIN decreases the distance between searchers and databases. The profession's control of information may be considerably more difficult in such an environment, particularly if efforts are made to market WESTLAW more broadly than it is now marketed and if rates are also reduced. This transformation can occur even if WIN turns out not to meet some needs of the legal profession. While lawyers may need a way to find cases that is at least as reliable as boolean searching, which itself has difficulties,[137] other consumers of legal information may not have such a constraint and may find that WIN satisfies all of their needs.

If the network eventually becomes the place containing the body of knowledge upon which the authority of the profession relies, it may turn out to be a place where space reserved exclusively for professionals is not as easy to design and where it is not as easy to exclude non-professionals as it was in the print environment. Electronic space appears to be a place where it is much easier to "bypass hierarchies."[138] As a result, and particularly as software becomes more useable and smarter and as electronic resources become more accessible to non-professionals, informational distance is reduced and pressure for change begins to build.

b. The network is more diffuse and heterogeneous than the print environment

In general, the electronic network opens up a much broader source of information for users than does a print library. The electronic network can be viewed as a larger, more inclusive and less differentiating space than is the physical environment, where different kinds of informational activities use different tools and are clearly separate activities. In the physical environment, for example, calling someone for advice is a completely different kind of activity than reading a book, which in turn is different than searching for something in a public library, which in turn is different than reading a newspaper at home. The network provides many resources and techniques to obtain information that are not

137. Burson, *supra* note 94; Dabney, *supra* note 94; McDermott, *supra* note 94; Runde & Lindberg, *supra* note 94.

138. QUARTERMAN, *supra* note 48, at 40.

as clearly delineated. For example, the same or very related tools are employed to consult individuals as to consult a database. Our large electronic space lacks the clearly defined boundaries around many activities to which we are accustomed. This is what is implied when it is said that everything is at one's fingertips. Instead of moving from one kind of information seeking activity to a distinctly different one, the network may be viewed as providing users with a variety of options, some providing the equivalent of turning on a television news program or consulting a popular magazine article and some the equivalent of conducting serious research in a library.

In addition to being an information space that links together sources of information that were separated in the print era, electronic networks considerably expand the number of sources of non-technical law-related information available to users. All networks involve sending and receiving messages in somewhat similar ways and the lines of demarcation that qualitatively separate print sources are much more difficult to locate. The Internet, commercial services and individual bulletin boards are quickly becoming linked to one another. The source of electronically acquired information of any kind, therefore, can be a person or group who has been contacted via e-mail, textual information, hypertextual information, an interactive piece of software or, more distantly into the future, interactive video. Once one finds one source, that source will lead to other sources, not by the use of arcane commands but by using a menu or relying on some other software that anticipates the needs of the user. Some of these sources of information may compete with traditional print sources but most will probably be novel alternatives.[139] They will be far more numerous than what is available in print and, at some point, more accessible as well.[140]

139. An existing example of a legally oriented but essentially hybrid collection is the electronic archive of the Electronic Frontier Foundation (EFF). EFF is, at the moment, self contained, in that it does not provide hypertextual links to other electronic sources of information. EFF provides an FTP site that is accessible on the Internet at FTP.EFF.ORG. It is also accessible via gopher. This site has a wide variety of information related to the goals, concerns and activities of EFF, ranging from legal documents used in cases, articles, newsletters, position papers and other material not readily accessible in a print environment.

140. It should be remembered that at present, the Internet, LEXIS and WESTLAW are all virtually image free. Using images, symbols, graphs, icons and other graphical devices can be extremely effective in communicating information. Although our print culture is largely text oriented, Cyberspace will eventually be able to exploit the enormous educational and informational capabilities created when text and images are merged.

2. *Expert relationships with information*

Easier or expanded access to information and the opening up of new sources of legal information may be desirable for society and may be enthusiastically welcomed by citizens, but legal professionals may react to such developments with some ambivalence. Easy and expanded access, for example, may not be the primary consideration of either the law or legal professionals. The professional is much more concerned than the lay person with the accuracy and authoritativeness of information than with easy, or even cheap, access.[141] The law has thrived in the print environment because there were accessible sources of standardized and trustworthy information. There are several levels of agents in the print environment, such as editors, publishers and librarians, who in a sense certify material before it can enter the print library. For this reason, the mere presence of something in a law library's collection has traditionally been an indication that the work had some degree of authority and authenticity.

The new information environment has fewer certifying agents. Because electronic space can grow faster and more cheaply than physical space, collections can grow faster and can also grow more easily without standards being applied to what the collection contains. Few professional librarians have control over legal information stored in electronic space on the Internet.[142] Indeed, one knowledgeable observer has compared the Internet to "a library where all of the books are dumped on the floor in no particular order."[143] This is somewhat of an exaggeration and partly a reflection of the network's early stage of development, but the bias of the network does tend to be inclusive rather than exclusive and distributed computing, as mentioned earlier, fosters this by allowing users to treat separate collections as if they are one. This is highly convenient but it is also not always clear

141. One author noted:

> No doubt as a matter of history [the] step from the pre-legal to the legal may be accomplished in distinguishable stages, of which the first is the mere reduction to writing of hitherto unwritten rules. . . . [W]hat is crucial is the acknowledgement of reference to the writing or inscription as *authoritative*, i.e. as the *proper* way of disposing of doubts as to the existence of the rule.

HERBERT L. A. HART, THE CONCEPT OF LAW 92 (1961).

142. John Doyle of Washington and Lee is the most notable of these. The creation of "virtual law libraries," where print material is being converted to electronic form and is accessible from remote computers, is occurring at Columbia Law School and the Chicago-Kent College of Law.

143. Robert E. Calem, *The Network of All Networks*, N. Y. TIMES, Dec. 6, 1992, F11.

where information originates or how to evaluate information that would not have been readily available from print sources. While there is no shortage of references to "electronic libraries," the organizing role that bibliographers and librarians have performed is left largely to software designers or to individual users. This raises problems because, at least at the moment, "most computer interfaces are not designed to allow the user to question data validity."[144] This challenges law because, as Virginia Wise has perceptively observed:

> [T]he increase in the volume of information makes it more necessary than ever for users of information to be critical consumers of the information available to them, knowing how to evaluate the raw data for authority, accuracy, bias, and incompleteness. Perhaps because law as taught is so much about authority, students are accustomed to thinking of legal sources of information as authoritative, but that habit ill-trains them for evaluating the various forms of locating information. Moreover, something about the sameness of computer screens often cripples students' ability to distinguish between sources, disabling them from making judgments of better or worse that they are so used to making in most other facets of their professional and personal lives.[145]

The manner in which users obtain information also contributes to this. Electronic information is always obtained through copying. Often in a manner consistent with requirements of the copyright law and sometimes in a manner that violates it, information moving over the network may not be simply copied but is used, worked on, adapted, and in a variety of other ways, altered in some fashion. There is, on the electronic network, a proliferation in sources of information as data is copied and moved and value is added to it. Current systems provide few cues about authenticity. They do not adequately explain whether the item one is seeking exists in one place only and there are multiple routes of access to it or whether the informational source is a copy made of the original or some other copy. It is not as easy as it once was to be certain that what one is looking at is necessarily the same as

144. Judith Perolle, *Conversations and Trust in Computer Interfaces*, *in* COMPUTERIZATION AND CONTROVERSY 355 (Charles Dulop & Rob King, eds., 1991).

145. Virginia Wise, *Managing Information Inflation*, *in* EXPERT VIEWS ON IMPROVING THE QUALITY OF LEGAL RESEARCH EDUCATION IN THE UNITED STATES 125 (1992).

some piece of information with the same name that was obtained from a different source. Similarly, there are no bibliographic tools available to inform a user that some item that has been found is the latest version. Whatever the process, the trustworthy character of print, where all copies are identical, seems impossible to match in the electronic environment.

This may be both a problem and an opportunity for law and for lawyers. It is a problem because

> [o]rganizations are networks of information flow; therefore, directing flow to the right places, filtering it in useful ways, and even preventing it from flowing to certain locations improves organizational performance . . . . [Commentators] argue that the primary goal from this perspective is not to produce more information, but rather to reduce the amount that any one subsystem must process.[146]

This is a much harder task for institutions that relied on print-based traditions and processes to focus attention, to regulate and to manage the flow of information. Yet, those who recognize and understand the differences between print and electronic space will understand why the role of the legal professional is changing and what kinds of tools can be employed to exploit the new electronic space. The lawyer's relationship with printed information was a relationship with information in a stable, authoritative and trustworthy form. Information was something that could be found or discovered and then analyzed, interpreted and applied. Cyberspace cannot help but gradually bring about a different attitude toward information because information will be less stable and will be updated much more often than can occur in the print environment. At the very least, this requires much greater sensitivity to and capabilities for dealing with change. As one teacher has argued,

> [m]anaging change is itself a technique, and a technique that can be taught like any other, but it is commonly ignored as teachers assume that the information retrieval techniques of today (or, even worse, of yesterday) will be those of tomorrow. In order to avoid this trap, instruction should emphasize the skills and strategies of dealing

146. Ronald Rice, *Mediated Group Communication, in* THE NEW MEDIA: COMMUNICATION, RESEARCH, AND TECHNOLOGY 158 (R. Rice ed., 1984).

with change . . . .[147]

Mastering change involves understanding that law is slowly moving away from a model where the nature of printed information is mimicked in various institutional processes. In an era of print, when one could assume that information was fixed in a tangible medium, an orientation naturally developed toward the lawyer as one who understood the nature of the print-web, who was proficient in extracting information from it, and who was knowledgeable in applying it. The lawyer in the electronic era, where experts are more easily accessible but trustworthy information might not be, where physical and informational distances are different than what they were, where citizens are not as distant from law and lawyers are not as distant from clients and where law will not be as distant from experience as it once was, can be expected to assume a much more challenging and dynamic role toward information and information processes.

"[T]he story of the law," write Collins and Skover, "is one of distancing text from context."[148] That has been the story for several millennia, since law became more focused on what was written than on what was said and since what was written became more important than what was said. The electronic environment, once it matures, will displace those who assume that information is automatically authoritative and that exclusive access to information can be maintained. The role of the lawyer may continue to involve the management of change but this will be a more dynamic and continuous process than it has been in the past. It will reflect a model of law "as connecting rather than disconnecting" and as a "flow of dialogue"[149] rather than as a seamless web hovering above life. It will be a more multidimensional[150] process in which those who will be successful will be those who understand the nature of electronic space because it will be through electronic space that many of the concepts, practices and approaches of law and legal practice will be defined.

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147. Wise, *supra* note 145, at 122.

148. Ronald K. L. Collins & David M. Skover, *Paratexts*, 44 STAN. L. REV. 509, 521 (1992).

149. BALL, *supra* note 12, at 122.

150. For an exploration of multidimensional approaches to legal reasoning, see Timothy P. Terrell, *Flatlaw: An Essay on the Dimensions of Legal Reasoning and the Development of Fundamental Normative Principles*, 72 CAL. L. REV. 288 (1984).