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PEER-REVIEWED JOURNAL ON THE INTERNET

THE SOCIAL LIFE OF DOCUMENTS

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- with an introduction by ESTHER DYSON

This document entered my life unexpectedly one Thursday morning. I was sitting next to John Seely Brown at a meeting. It could have been anywhere, but it was in Rancho Santa Fe, north of San Diego, and the meeting was about document architecture. John handed me the stapled document; at that point, it was a token that said, "I know you're smart enough to read and listen at the same time. I think you would enjoy this, and I'd value your opinion."

In the spirit of things, I wrote in the margin…I might not have done so if John hadn't been there to show the comments to. In the end, I read about half of it and saved the rest of it to read during the break. It was too rich to absorb as the same time as a discussion of document standards. The document itself was a marvel of documenthood; it was about itself, and about every document in the world. It was its own appendix. So, enough of the comments. Here's the document itself.

Esther Dyson

Exaggerated Rumors of Death

The advent of new technology has suggested to many that the document was nearing the end of its influential reign. Old document forms and institutions -- books, journals, and newspapers, on the one hand, publishers, and libraries, on the other -- seemed about to dissolve before our eyes. Some assume that technology will allow us to distill pure information, leaving the document, as such, behind in the ashes.

Yet, just as the elegies were being written, the explosion of the World Wide Web (for which the $2 billion launch of Netscape is not the most significant piece of evidence, merely the most countable) has made us think again about not just the resilience, but also the significance of documents. The success of the Web, particularly following the development of Mosaic and Netscape software, argues that both the document metaphor and documents themselves may be as important to the "information galaxy" of cyberspace as they have been in its Gutenberg equivalent.

To fully assess the document's evolving role requires a broad understanding of both old and new documents. For documents are much more than just a powerful means for structuring and navigating information space -- important though that is. They are also a powerful resource for constructing and negotiating social space. It is the latter quite as much as the former that has made the documents of the World Wide Web so popular.

Books are not absolutely dead things, but do contain a potency of life in them to be as active as that soul whose progeny they are

John Milton, Areopagitica

Yet the "social life" of the document is not widely recognized. Consequently, this essay focuses primarily on that social life as it appears in both old and new uses of documents. Seeing documents as the means to make and maintain social groups, not just the means to deliver information, makes it easier to understand the utility and success of new forms of document. This social understanding of documents should better explain the evolution of Web as a social and commercial phenomenon.

Documents as Darts?

School formed most people's subliminal idea of what a document is. But it probably took more than the painful process of learning how to write a five-paragraph essay. For many, there was also that startling first time someone's careful folding transformed a page from an exercise book and a newly created paper dart took flight across the room.

Though no doubt mischievous, this classroom recreation of the Wright brothers was probably more supportive than disruptive of classroom activity. For it merely underscores the widely held notion of the document as some sort of paper transport carrying pre-formed "ideas" or "information" through space and time. By darts or didacticism, we all usually come to believe that, like freight, information is boarded on a document at one end of its journey and taken out at the other. If a little is lost in the transaction, to most this seems no more significant than the occasional package lost in transit.

The idea of a document as a carrier is an example of what Michael Reddy calls a "conduit" metaphor. People regularly describe most communication technologies in conduit terms, talking of information as "in" books, files, or databases as if it could just as easily be "out" of them. We ask or are asked to put ideas "down on paper," to "send them along," and so forth.

Undoubtedly, this metaphor captures important aspects of communications technologies. But it simultaneously hides others. As new technologies take us through major transformations in the way we use documents, it becomes increasingly important to look beyond the conduit image. We need to see the way documents have served not simply to write, but also to underwrite social interactions; not simply to communicate, but also to coordinate social practices. By following research that has gone beyond the limits set by the conduit metaphor, this essay attempts to bring into view a broader idea of the document and to emphasize how and why it has a future as well as a past.

Linked by Text

The sociologist Anselm Strauss explored the way new forms of document allowed new forms of community (or as he calls them, "social worlds") to come into existence. His work predates the proliferation of computers and so provides an interesting view of the way other developing technologies (copiers, faxes, and so forth) supported social relations in new ways. In particular, new media allowed small communities (enthusiasts of exotic breeds of birds or antique motorcycles) to form though their members were often few, and those few spread over large distances.

These groups can look surprisingly like modern equivalents of the scholarly communities that formed throughout the world in the Renaissance. These too were held together by common interests and shared communications. The letters circulating among the Fellows of the Royal Society in England formed the prototype for scientific journals, which still bind intellectual communities together. And indeed Strauss's initial observations were based on the new ways scholars were building communities of interest with the support of new communications technologies -- and, as we have argued elsewhere, may help understand the future of

scholarly communities in the digital age.

Photocopiers, faxes, and other forms of cheap reproduction have allowed not only scholars, but other groups of people with shared interests to form a "social world" with relative ease and autonomy. Neither capital nor authorization was needed. From political undergrounds connected only by samizdat journals to wind-surfers, DeLorean owners, and beekeepers, people with shared interests use communications technologies (both hi- and lo-tech) to help form themselves into self-created and self-organizing groups. To a significant degree, these are held together by documents circulating among members, keeping each conscious of being a member and aware of what others are up to.

One of the most astounding recent examples has been the spread of "zines" -- cheaply produced newsletters. Needing little more than a typewriter or word processor, a photocopier and stapler, and the Post Office or a fax, zines are often put together at home by one or two people and are "mid-cast" among small groups. The practice began with fans of particular television programs and rock groups. Consequently, these documents were known as "fan-zines" and now just "zines." One estimate reckons that these "Xeroxed, hand-written, desktop-published, sometimes printed, and even electronic" documents (as the 1995 zine convention in Hawaii puts it) have produced some 20,000 titles in the past couple of decades. And this "cottage" industry is thought to be still growing at twenty percent per year.

Consequently, as never before, scattered groups of people unknown to one another, rarely living in contiguous areas, and sometimes never seeing another member, have nonetheless been able to form robust social worlds. From hound dog owners to herbologists, and from fans of The Avengers to Star Trek's "Trekkers" (said to hate being called Trekkies), the easy circulation of shared communications has helped build well-coordinated social groups with a strong sense of shared identity.

The role of documents in linking people this way helps explain the particular enthusiasm of small, widely scattered interest groups for the Internet, where electronic zine publishing, which at the margin is even cheaper than conventional zines, is developing rapidly. The Internet now has over 600 e-zine titles (from The Abraxus Reader, and Abyssinian Prince to Zen Anarchy, ZIPZAP, to Zmagazine), and growth will almost certainly outstrip the twenty percent of the paper form. Once again, people can first recognize and then develop shared interests through their access to shared documents.

The growth in zine titles, both on and off the Internet, may also indicate how much more volatile new documents make social worlds. The key to forming a new group is starting a new publication to help hold it together. Consequently, as publication costs come down, formation becomes much easier. This allows people to test the "market" for a new group quite cheaply. Those who do are often staggered at the response.

Equally, however, disintegration is also easier. Strauss (no doubt drawing again on his experience with academic communities) notes that, once formed, social worlds continually face disintegration (as dissenting members split off into "sub-worlds"). In the past, the cost of starting a new sub-group undoubtedly put limits on dissent. As the costs descend, forming a splinter group becomes easier. Low-inertia resources inevitably make both worlds and sub-worlds correspondingly labile. Old paper forms may, then, have been a resource for stability. And the volatility allowed by newer forms may help account for the large number of "404" dead links on the Internet, marking zine sites that have already been abandoned by groups, some of which might all along have been more imaginary than either real or virtual.

Political Linkage

Strauss's argument helps illustrate the importance of documents to the formation of communities. It doesn't necessarily, however, undermine the idea of the document as a dart rather than a more sociable object. The social rather than directly informational life of the document is clearer in a social exploration of documents set on a much larger scale (both historically and geographically) by the political scientist Benedict Anderson in his book Imagined Communities.

Anderson argues that a document culture was a key ingredient in the creation of independent nations in the late eighteenth century. Printed documents, Anderson maintains, were essential to replacing the ideology of sovereigns and subjects by creating the idea of a self-constructed society built around shared ideals and shared practices. Anderson's foremost example is the United States. Here the documents that first come to mind include such seminal works as the

Declaration of Independence, the Articles of Confederation, the Federalist Papers, and the Constitution.

But Anderson suggests that "popular" cultural items, such as journals, novels, pamphlets, lampoons, ballad sheets, and so forth were equally important in creating the cultural sense of common interests necessary for the nation's formation [1]. The emerging daily newspapers were, in particular, signally important in constituting the nation -- but not simply through the "news" they carried, which, much as today, was often little more than gossip and scandal dressed as public interest. It wasn't, though, simply the content that helped bind the nation. It was as much their wide circulation. Reaching a significant portion of the population, newspapers helped develop an implicit sense of community among the diverse and scattered populace of the separate colonies and the emerging post-revolutionary nation. This sense of community was quite as significant as the explicit arguments in political documents about the right to independence from the British Crown [2]. That is, the emergent common sense of community contributed as much to the formation of nationhood as the rational arguments of Common Sense. Indeed the former helped create the audience for the latter.

Anderson calls the resulting community an "imagined" one. This is no slight. An imagined community is quite distinct from an imaginary community. It is one, Anderson notes, whose members "will never know most of their fellow members, meet them, or even hear of them, yet in the minds of each lives the image of their communion." Where an imaginary community does not exist, an imagined one exists on too large a scale to be known in any other way. And the central way they can be imagined is through the documents they share.

In the case of the American revolution, newspapers, the first mass-produced and mass-consumed objects, were crucial in making their dispersed readers aware of Anderson's "communion" across space and time [3]. The proliferation of daily newspapers, pamphlets, journals, and tracts made each reader aware that what he or she was doing thousands and possibly tens of thousands of others were doing at the same time and with the same interests. As Anderson puts it,

An American will never meet, or even know the names of more than a handful of his…fellow-Americans. He has no idea of what they are up to at any one time.

But given the shared practices suggested by the appearance at regular times of objects like the newspaper, readers (both male and female) became aware of each other's "steady, anonymous, simultaneous activity."

Importantly, this idea of a nation built to a degree around a new sense of space and time through the possession of shared documents encompasses not only the original making -- or what Gray Wills called the "inventing" -- of America, but also its continuing maintenance. As the imagined community of the United States developed, visitors from the French sociologist Tocqueville, the English authors Dickens and Trollope, to the Dutch historian Huizinga have noted how important newspapers seem to be to American society. The newspaper, Huizinga wrote in 1926, fulfills in America the cultural function of the drama of Aeschylus. I mean that it is the expression through which a people -- a people numbering many millions -- becomes aware of its spiritual unity. The millions, as they do their careless reading every day at breakfast, in the subway, on the train and the elevated, are performing a…ritual. The mirror of their culture is held up to them in their newspapers.

Ideas of cultural objects not just connecting, but coordinating social performance help explain the social life of various documents. Radio and television programs and movies, all different types of document, have provided a similar and yet more extensive sense of social coordination. In the morning at work people would discuss what they had seen at home the night before, again with an implicit sense of coordinated practice. To some degree, in the United States network broadcasts took over some of this ritual role from the nineteen fifties on. Newscasters, for instance, began to assume a central role in the daily ritual.

In this way, document forms both old (like the newspaper) and relatively new (like the television program) have underwritten a sense of community among a disparate and dispersed group of people. As newspapers recede before broadcast and on-line communication, and as the multiplication of television channels disrupts schedulers' control over what is seen when, the strong feeling of coordinated performance provided by these documents is changing. One possible result may be that the loss of simultaneous practice will reinforce the need and desire for common objects -- the wish at least to see the same thing, if not at the same time. Here

the Internet is a particularly powerful medium for providing access to the same thing for people more widely dispersed than ever before. Moreover, the reach of the Internet is increasing a sense of simultaneity as ideas emerging on one side of the world can almost instantaneously be picked up through the Internet and absorbed into the local context by communities on the other.

Nonetheless, it seems equally probable that, as they become fewer, those occasions when we still do all feel we are doing something together -- from the transient camaraderie achieved by the audience in a movie theater, to the sense common sympathy achieved by those standing in a midnight line for the launch of Windows '95 (unintelligible to most others), or the sense of nationhood achieved by watching the Super Bowl -- will become increasingly significant. People's memories of where they where when war broke out or the president was shot perhaps testify to the continuing power and importance of social simultaneity. The unexpected success of the movie Apollo 13 suggests how powerful moments of national drama and documents about such moments can be in maintaining our sense of "communion" and community. This remaining power continues to make those documentary forms (newspapers, television programs, radio news, movies, and books) that support such events and create a sense of both simultaneity and commonality remarkably resilient, even as they become technologically "outdated." For instance, people still like to read Business Week when it comes out in hard copy, even though its text will be available through America Online the following month. People still read hardback books, even though they will cost one-third as much in paperback a year later. And people still go to watch movies in first-run houses, though they could rent the video at half the price the following year. Not just reading the same thing, but reading it at approximately the same time as other people is still important.

Negotiating Meaning

Anderson's ambitious argument takes us far beyond the notion of the document as a dart or conduit carrying information. Ultimately both his and Strauss's arguments concur in showing how the circulation of documents first helps make and then helps maintain social communities and institutions in ways that looking at the content alone cannot explain.

In offering an alternative to the notion that documents deliver meaning, both arguments instead suggest connection between the creation of communities and the creation of meaning, for communities seem to create meaning for themselves. The work of the literary critic Stanley Fish helps develop this issue. Noting that different social worlds can fight over the "right" interpretation of a document, Fish argues that there is in fact no right way to choose among alternatives. Echoing earlier arguments of Stephen Toulmin about competing scientific theories, Fish points out that for there to be a "right" way, there must be a standard and a judge external to all of the competing community-based alternatives. But there is no external fulcrum to move these social worlds that is not itself merely the internal standard of another social world.

Contentiously, Fish claims that a document "is an open category" defined by "what we [as readers] decide to put into it." But Fish retreats from this a little, concluding "the reader is identified not as a free agent…but as a member of a community whose assumptions about literature determine the kind of attention he pays and thus the kind of literature he makes." At it's extreme, this viewpoint makes the creator of a document almost epiphenomenal. But more moderately it suggests that she cannot determine the document's meaning. Nor is meaning in any sense simply "in" the document itself. Rather, it is constructed by the "community of interpretation" around the text or document under consideration.

It is probably a mistake, however, to conclude that, because meaning is an internal construction of a community, meaning can be taken for granted as shared within a community. Certainly that is not true of Anderson's imagined community. An entire country might imagine itself to be a community. But it is quite unlikely to imagine everyone in it has exactly the same interpretation, whether of the morning paper or the constitution. If they did, there would be neither political pundits nor Supreme Court Justices. Even Strauss's smaller social worlds are unlikely sites for shared meaning. Anyone who has sat among baseball fans discussing the meaning of a page of statistics, for example, knows that even close-knit communities can find uncountable different meanings in a single page. Within a community, then, it can only be assumed that general strategies of interpretation are shared; meanings may not be.

Seen this way, shared documents within communities are in many ways simply the grounds for a fight, merely the pre-text for agreement. Providing a shared context for constructing

meaning, documents are the beginning rather than the end of the process of negotiation. Understanding this, Huizinga was particularly critical of the teaching of writing in the States. Writing, he worried, was presented to students as the outcome of deliberation. Whereas, Huizinga maintained, it was really just another part of the deliberative process. This view of the document as a medium or resource for negotiation suggests that one avenue for technological development lies in improving the means for negotiation.

Means for Negotiating

It is perhaps a reflection of the fact that documents tend more to raise debate than to quash it, that the great documents of civilizations (the Bible, the Q'ran, the works of Shakespeare, the Analects of Confucius, and so forth) are responsible for uncountable commentaries engaging warring communities of interpretation over debates about what they mean.

Marginal notes, footnotes, and conventional commentaries are merely the clearest examples of the ways that writing continually provokes more writing and that texts provide context for each other. (Imitation, parody, pastiche, allegory, and plain plagiarism are, of course, others.) From turned down pages, to notes on a dust jacket, to academic essays, to fan zines, to direct quotations and indirect allusions, to stories lifted for future retelling without attribution, we are always commenting on texts, which continually intertwine in a process grandly known as "intertextuality." Documents are not, then, independent. Like biological organisms, every document is always related to some other.

Indeed, writing on writing is both literally and metaphorically an important part of the way meaning is negotiated. Annotation is a rich cultural practice which helps, if only by the density of comment attached, to signify the different cultural importance of texts and parts of texts. The thin trickle of original text overflowing a vast dam of commentary, the long introduction, and the separate subject entry in a library catalog offer clear indications that a particular text is socially and culturally valued.

But commentary is not just for the Bible and Shakespeare. We recognize important organizational documents from the long and impressive routing slips attached, the handwriting we recognize in the photocopy's margin, the assertion "surely you've read X's paper," and so on. And we assert our membership in a community in part by showing we have read these documents -- which is why we often like to be sure our own name gets on routing slips and our own handwriting appears in the margin.

It is the easy support of marginal commentary that makes the fax so useful. Not only can we annotate in manuscript, but we can send the annotated fax on as another fax. The commentary always accompanies the piece of text to which it refers. Nicholas Negroponte, the director of the MIT Media Lab, often expresses surprise that the fax machine is on the one hand so popular while on the other not digital. Yet it is the close analog link between text and commentary -- the fact that the commentary is literally on the text -- that makes faxed documents so resourceful.

Conventional forms of publishing long ago broke this link. Early note forms did appear in the margin, much as in faxes now, but the demands of typesetting soon pushed them to the foot of the page, before relegating them to the end of a chapter or the back of a book. In doing this and leaving the printed page pristine, publishing made intertextuality seem a highly abstract notion. Hypertext software, however, has revived the immediacy of intertextual links. Furthermore, not only are commentaries attached to the section of a document at issue, but links can take readers not merely to a reference, but to the text it refers to. Dense and elliptical footnotes ("LL. Edg. s14 apud. Spellm. Conc. vo. i.p.471," being an unexceptional selection from a standard history of England) give way to access to the actual text referred to.

Furthermore, like faxes, hypertext links allow more than an author's qualifications and citations. They also support interchanges between authors and readers. In the process, they have brought to the negotiation of meaning more serviceable means for this sort of negotiation. A community's debates on or around a document can now be continuously added to that document. People can see someone else express doubts that perhaps they felt no one else shared or were unwilling to voice. Questions that have been asked and answered remain for later readers to understand, without anyone needing to go over the same ground again. Indeed, many Internet sites have "FAQ" documents, where newcomers can look at "Frequently Asked Questions," to save everyone the trouble of asking and answering them again. These documents, beyond the questions and answers, can also give newcomers to a particular community a useful sense of the group and its interests.

One particularly resourceful tool has been designed by Dan Huttenlocher of Cornell University and Xerox PARC and Jim Davis of the Xerox Design Research Institute at Cornell. They have developed an annotation tool called "CoNote" for documents on the World-Wide Web. CoNote allows people reading a Web document to attach annotations at certain points. Anyone reading the document has access to the annotations. CoNote thus allows readers, particularly a community of readers, to hone the document for community use by adding community commentary. It could also help to bring people into a community while allowing outsiders to see a group's particular concerns and, perhaps, to respond to them.

Furthermore, the appearance of entire conventional books at Web sites now supports intertextual research and practices. Almost every day a new site appears with searchable and downloadable texts. Some allow commentary, too. Primarily, these sites involve classic texts. Works of Chaucer, Shakespeare, Adam Smith, Thomas Jefferson, Karl Marx, and John Stuart Mill can all be found in full text form. But enterprising publishers are also developing sites for new works. City of Bits, a new book by William Mitchell, the Dean of MIT School of Architecture, and published by MIT as a conventional hard-cover book, appeared simultaneously in electronic form at a Web site and readers' comments are solicited.

Both Huttenlocher and Davis's tool and MIT's book site help illustrate the potential symbiosis between new and old forms of documents. Technophiles and bibliophiles have engaged in rather fruitless battles in which the former point out that you can't search or link hard copy documents, while the latter point out you can't read on-line documents in the bath or on the beach, or even at your desk with much ease. There the debate has stood. The intriguing intertextuality of two versions of the same text, one digital and one analog, does a great deal to meet both demands. MIT Press is optimistic enough about the symbiosis to include an order form for the hardcopy at the Internet site, suggesting that the publishers expect many readers will recognize the utility of the off-line version.

More generally, creative use of new documents no longer involves direct challenges to old ones, with on-line forms replacing hard-copy predecessors. Rather, these new forms appear to reinvigorate the old, extending their useful social life not ending it. Thus, as another example, on-line library catalogues providing abstracts, indexing, and in some cases full texts for print journals have reinforced these journals rather than undermined them. The journals still remain the best social filter for the flood of writing available on any topic as well as the best repositories of the development of ideas and attitudes. In these realms, digital media, as yet, do not compete. The electronic resources, however, have made using print journals much easier than during the Gutenberg era.

Unlike Huttenlocher and Davis's Web tool, commentary for Mitchell's book is not attached to the document, merely sent to the author. Consequently, readers do not get to see or respond to each other's opinions; only to what Mitchell wrote. This difference may well reflect the difference between the sites. Huttenlocher and Davis's tool was designed for closed Web sites for particular student groups. The community of users is already defined and the commentary is thus likely to be efficient and pertinent for all. Outsiders are excluded. Mitchell's book, on the other hand, is open to all comers. It has no predefined community, nor anyone engaged in defining the community in the way many bulletin boards or e-mail lists have. Documents on their own, this suggests, cannot define a single community. Rather, as Fish's work suggests, they are likely to be subject to the competing claims of a variety of communities, each with different and some with incompatible interpretation.

This might suggest, as indeed Fish's work sometimes does, that documents only exist within communities and can play no role at all between them. Conversely, some discussion of the Internet and its extraordinary reach tend to assume that it's possible to ignore the particular foibles of communities, because Internet documents have some sort of universal character. The first of these positions is too reductive, while the second, ignoring the communal base of interpretation, too expansive. The interpretation of a document always depends on community standards. Nonetheless, documents can and do play important roles in negotiating differences and coordinating practices between communities.

There are, though, differences between internal communication -- where the stripped down zine, often uninterpretable to outsiders, has proved uniquely powerful -- and external communication -- which requires more explicit documents like contracts and business letters. Intercommunal and intracommunal documents are not, however, necessarily two quite different sorts of document. More usually, they involve two different practices built around the

same documents. Within communities, documents face the challenge of gaining attention of community members. Between communities they face that challenge and the difficulty of coordinating practice despite different interpretive strategies. The following sections look at some aspects of these different uses, but on the assumption that these are not necessarily two different types of document, but more usually a single document that is playing both roles.

Engaging the Community

The French sociologist Bruno Latour points out that a primary characteristic of documents is their mobility (the other is their immutability). Documents quickly pass beyond the reach and protection of their maker and have to fend for themselves. A central challenge, then, is to engage the interests of the community they are intended for. As the number of documents multiplies dramatically and their reach is extended by information technology, the challenge of engaging an intended audience grows too. The swelling number of documents and the shrinking amount of time available for each one raises the problem of what Richard Lanham calls the "economy of attention," evident as much in the diverse envelopes of junk mail, each with a separate strategy for getting read, as anywhere else.

The central issue here is for the intended audience to be able to recognize documents intended for them. Faced with similar problems, and realizing that books were not universal documents but addressed different audiences, book designers (and product designers more generally) long ago developed numerous strategies that help readers distinguish different kinds of books. Consequently, books use far more than their title to engage certain audiences and tell others to pass by.

In an increasingly crowded attention economy, the challenge of reaching an intended audience accounts for the demand for sophisticated Web-page designers and the importance of autonomous agents on the net that can plant links in strategic sites. Despite this work, with most links and pages, it's still very hard even to make even a reasonable guess at the intended audience. This difficulty may reflect an implicit assumption by many that documents have universal appeal or that content alone will marshal an audience. Yet if the overall form appears unclear, few will linger over the content, especially given the ease with which links allow people to pass by.

Documents as Boundary Objects:
Patrolling & Controlling

Documents that pass successfully between communities need to be able to engage (at least) two interpretive strategies and to survive where the recipients can no longer be assumed to share the interpretive assumptions of the members of the originating community.

Within a community highly condensed forms of communication, which rely on the shared assumptions of the community, work well. Between communities these must be elaborated, often to the exasperation of the original community, whose members can see the elaboration as redundant. Anyone who has used the Internet much has probably come across the different approaches. Most ftp sites, which are usually constructed primarily for use within a known community, are almost completely inscrutable -- a collection of files with semiliterate names. Successful web sites designed to engage people from different communities have, by contrast, a much more public face.

In passing between communities, documents play an important role, bringing people from different groups together to negotiate and coordinate common practices. Such negotiations are particularly significant in institutions, such as bureaucracies and corporations, that comprise many different communities. Here the direction of the institution as a whole depends on the successful outcome of negotiations among its constituent groups, all of whom have particular interests at stake. Both the means and a willingness to come to a shared understanding are vital to the effectiveness of such institutions. Because documents (or as the sociologist Leigh Star calls them "boundary objects") passing between communities face different interpretive strategies in each one, the challenge of coordinating practice around them is always theoretically and often practically problematic.

One result of frequent intercommunal communication may be cross-border communities, groups of people who are, collectively, capable of dealing with the codes of both worlds and of talking a common language among themselves. These groups are essentially bilingual in terms of the two dominant communities their members come from. Institutions can strive to create such groups, but the more effective ones tend to emerge. Studies by Julian Orr, a workplace

anthropologist at Xerox PARC, suggest that sales representatives and their contacts in other corporations often form what is in effect a small interstitial and metaphorically "bi-lingual" community crossing the boundary to deal with the inability of the two dominant communities to communicate directly.

But intercommunal communication isn't only a matter of comprehension and coordination. Documents are also used to patrol and control. In the first case, documents can patrol community boundaries rather than cross them. Strange formats, unexplained generic conventions, jargon, abbreviations, allusions, as well as private languages are all examples of ways in which documents keep people out as much as bring them in. More simple than obfuscation, of course, is simple secrecy. Documents are kept from certain eyes. Encryption, blind "carbon" copies, restricted access and so forth, make secrecy quite as prevalent on the Internet as it has been in the world of paper documents. Many Internet sites simply restrict access to registered users.

Control, however, is often more subtle. Leigh Star and her colleague James Greisemer make this apparent in their discussion of "boundary objects" -- objects capable of crossing the boundary between communities or social worlds. Boundary objects, Star and Greisemer note, are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual site use…. They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation. The creation and management of boundary objects is a key process in developing and maintaining coherence across intersecting social worlds.

Star and Greisemer's argument makes it clear that with documents, control is more salient than coordination. The idea of "translation," borrowed from Latour, explains some of the complex relations involved when documents move between different communities and the interests of one community are translated into the terms of another. Inevitably, Star and Greisemer argue, the process of translation often represents an attempt to subordinate one group to the other's interpretation. (JoAnne Yates's Control through Communication suggests how this practice emerges among the communities that make up a corporation as different constituent groups bid for and assert control.) As Strauss's work suggests, similar struggles within communities can lead either to domination or separation of different factions into new and distinct communities.

In sum, intercommunal documents can both promote and retard institutional development, depending on whether boundary objects lead to collaboration or control. Understanding the potential for both is thus particularly important for large institutions.

Documents, Determination, and Enabling

The issue of documents as instruments of power and control is an important one. Much debate around this issue, however, tends to argue that document technologies determine certain social processes -- either for good or for ill. So, for example, theorists of literacy such as Walter Ong, Marshall MacLuhan, Elizabeth Eisenstein, Jack Goody, and Richard Lanham, have painted the onset of democracy and the rise of individual freedom as the inevitable and unavoidable outcome of the spread of printing or information technology. From a profoundly different perspective, Weberians, Chandlerians, and Foucauldians have linked documentary technology to the rise of social control and the increasing spread of bureaucratic-institutional power and repression.

While document technology is undoubtedly linked to both, neither of these accounts gives the whole picture. And neither result is inevitable. As Oswyn Murray has suggested, it's more reasonable to think of technology as an enabler with the potential to support various scenarios. Which scenarios will play out (and there will undoubtedly be more than one), will be the result of a great deal of social work, conflict, coordination, and creativity, conducted around but not determined by the technology.

This argument surely holds for the Internet, too. Some argue it will fulfill social democratic ideals, others that it will undermine civil, political, and economic institutions. Each outcome is no doubt feasible, but the technology alone guarantees neither. The outcome of contemporary social-technological pressures for change, whether for good or for ill, will be the result of social struggle and negotiation. Consequently, the means of negotiation are particularly important. Here, the Internet and related technologies are intriguingly both the forum and the topic of

debate.

Performance

Changes in documentary forms have lead some to foresee a shift from "objects" (such as paper documents, software programs, concert recordings) to "performance." The journalist John Perry Barlow, for instance, points out that recordings of rock bands are rapidly losing value because they can so easily be pirated. Cheap analog recording devices like the conventional tape recorder produced such poor copies of originals that for most fans it was worth paying to buy a professionally cut disc. Similarly, with print documents it has usually been easier to buy than to copy. But now digital technology makes the production of copies indistinguishable in all essentials from the original, making copying often the cheaper and easier choice. This, Barlow argues, puts a premium on performance. Musicians will give away recordings to attract audiences to concerts, which is where money can still be made.

Simultaneously, some claim that written documents are moving from the permanence of old forms to the performance of new ones. Certainly, notions of "real-time response," "collaborative work," "multi-authored hypertexts," "shared documents," "relational databases," "on-line editing," "continuous up-dates," "interlinked data," "live video links," and other properties suggest that their malleability makes new documents significantly different from old ones. Those who struggled for years with stencils and White Out undoubtedly appreciate the shift from fixed to a different sense of fluid.

Nevertheless, it's important not to ignore some counterpressures developing within the new technologies themselves. While many technologies strive to achieve the immediacy of the conversation, the phone call, and other live links, people occasionally use new technologies to achieve the opposite: to escape that very immediacy. For instance, e-mail and faxes may be used to overcome the delay of "snail mail." But people also use them for messages that could be delivered by the more conversational phone call. While voice mail allows us to leave messages for people we cannot reach, occasionally people use it to avoid reaching someone they would prefer not to talk to. Similarly, people allow an answering machine to pick up and announce "I'm not here, now," even though "I" is indeed "here" and listening in, just to add a little delay between message and response.

Practices like these are not simply desperate responses to the burdensome pressures of modern life or information overload. They are as much innovative ways to reintroduce time and physical traces into what would otherwise be immediate and ephemeral exchanges. At the very least, they suggest that delay and fixity may be just as important to all of us as immediacy, mutability, and indivisibility. While everyone can benefit from technology capable of overcoming separations of space and time and the convergence of producer and consumer, it seems people are beginning to appreciate how important these distinctions can be. New technologies help us to transcend burdensome barriers of space and time. But, in part through the improvisations of users, the same technologies are also valued for their ability to reinject both space and time into communication. Written forms have long done this. Madame de Stael was known to write letters to fellow guests in the same house she was visiting -- to people, that is, to whom she could just as (or more) easily have talked had she so wanted to.

In general, new technologies have minimized the technological separation of producer and consumer. It is a shift of some significance that the computer we read on is also the one we write on, whereas the book we read is very different from the manuscript we write. This single medium makes the intertextual relationship of reading and writing more than an abstruse intellectual concept. What the French historian Michel de Certeau calls "poaching" -- the act of taking text from someone else's writing to use it in your own -- is not merely a feature of high modernist works such as Joyce's Ulysses or Eliot's Waste Land. It is also an everyday occurrence in zines. Henry Jenkins has shown how zine writers continually appropriate television and magazine texts for their own purposes. Software like Storytime also engages readers in the active production of stories, turning esoteric theories about "reading as writing" into practical occurrences.

Nonetheless, despite the technological shift, the social distinction between producer and consumer or writer and reader remains useful. CoNote and the MIT Press Web site for Mitchell's City of Bits, for example, allow documents to be annotated or commented upon, but not rewritten by readers. Requiring an "original" to be annotated, these tools implicitly rely on the distinction between original and annotations, producers and consumers. Readers do not change the original form of the document -- that remains intact. Rather, they comment on it, and in the case of CoNote, add to it -- amplifying, qualifying, dissenting, but maintaining the

original document so that others can then measure text against commentary, while clearly understanding which is which. The relationship between text and commentary is symbiotic. Each is augmented; neither is erased. Indeed, because they designed CoNote for teaching, Huttenlocher and Davis allow the original producer to control where commentary may be attached. Production and consumption thus come closer, but they do not completely elide. In general, this is true of most documents on the Web. They may often relinquish some control. They rarely abandon it completely.

Here the MOO offers another intriguing case. Developed from on-line game environments that allowed several participants to play a computer game of Dungeons and Dragons together, MOOs (an acronym for Object-Oriented Multi-user dungeons that somehow came out backwards) allow participants to communicate and program collectively in real time though they may sit at computers a world apart. As Larry Masinter of Xerox PARC, where MOOs were developed, has pointed out, MOOs are really huge collaborative programming environments: collaborative but not cooperative -- indeed some people in MOOs are quite uncooperative. What remains astonishing is that so many people of so many different abilities can program simultaneously in a shared environment without bringing that environment crashing down. Masinter attributes this to the fact that the integrity and ownership of each person's program are rigorously honored by the system. Objects can interact and code can be shared, but code cannot be altered without its creators' consent. Again, the distinction between producer and consumer is maintained.

In general, then, the degree to which the roles of producer and consumer, rigorously enforced by most old document technologies, are kept separate by new ones is a matter for negotiation. The distinction is now an option, determined by the system in each particular situation, rather than a necessity. The distinction between producer and consumer has not been irrevocably erased. Nonetheless, the social implications of this shift from necessary to optional are far from trivial [4].

Fixed and Fluid

The curious return of capture and fixity and the distinction between production and consumption just as technology seemed to be increasing our freedom from these suggests that while "being digital," as Nicholas Negroponte calls it, is undoubtedly important there are aspects of analog life that people are eager to keep. A century ago, the French poet Baudelaire claimed that art is half "the transient, the fleeting, the contingent" and half "the eternal and the immutable." Art and eternity are beyond the scope of this essay. Nonetheless, the idea of an interchange between the immutable and the transient, the fixed and the fleeting seems central to understanding documents and their many uses. Moreover, as David Levy has stressed, a simple opposition between the two misrepresents the character of the old and the new. Both are capable of both. Fixity can be traced back to monuments, cave paintings, and inscriptions; transience to conversation, ritual, and performance. And, in the realm of clay tablets, chalk boards, erasable pencils, and movable type, mixtures of the two have been available for a long time. It is a gross oversimplification simply to denounce fixity and embrace transience as if we could have only one.

Even if, then, we are not in the middle of an irreversible transition from fixity, what does seem to be inescapably different now is that the two, the transient and the immutable, are materially no longer mutually exclusive. Now it's possible to have mutability where once there was only fixity-in, for example, the digital document. Equally, to have fixity or capture, where once there was only transience-in, for example, the analog recording. As a result, certain previously inevitable characteristics of practice can no longer be taken for granted. Many choices were once implicit in materials. By using paper, we left a trace. As Fitzgerald's version of Omar Khayyam puts it,

The Moving Finger writes; and, having writ, Moves on: nor all their Piety nor Wit Shall lure it back to cancel half a Line, Nor all they Tears wash out a Word of it.

In contrast, voice once left no trace beyond the fallibility of memory. But today, as we write on screens, our writing may sometimes be as ephemeral as the voice. Whereas, as Richard Nixon discovered, whispered comments can be captured as robustly as a stone inscription.

Changes in technology make it clear that we can no longer take for granted a correspondence between social purpose and technological resources. Now a trace may appear where it wasn't expected, or disappear when it was taken for granted. This change doesn't insist we simply leap from product to performance, renounce fixity and embrace transience, become digital

where once we were material. Rather, it suggests that we should consider a symbiosis between the two. Moreover, we should consider not only the fascinating possibilities presented to us by the digital document, but also the importance of the immutable and the transient to central social practices from preserving great (and even minor) works to signing contracts and cashing checks.

From this point of view, the fixed, immutable "document" is best understood not as an inferior and outdated alternative to conversation or other types of unmediated and immediate communication, but, in appropriate places, as an object that plays valuable social roles because it mediates and temporizes, records traces and fixes spaces, and demands institutions as well as technologies of distribution. Attempts to introduce time stamps, hash marks, and other forms of electronic version identification stress how important to social and particularly legal institutions the idea of a fixed state of a document is. Being able to talk about the "same" document, for all the Hereclitan conundrums, is extremely useful. As the historian Roger Chartier and the sociologist Pierre Bourdieu have argued in a nice allusion to the well-known French cliche, this fixity is not as limiting as might be thought. The document, they note, changes by virtue of staying the same. This paradox draws attention to interactions between fixed documents and flexible social practices.

If the utility of both the fixed and the fluid is recognized, the Web may develop much of its innovative power from the possibility of producing documents that combine both fixity and fluidity. Already, many documents retain a constant text while their links are continually changed. As the social roles of continuity and change, of areas of stasis and areas open to dynamic revision, are better understood, social institutions may develop around this joint capacity in intriguing ways, much as libraries developed their usefulness out of the juxtaposition of fixed individual texts combined to an ever expanding collection and a continually revised set of interlinked catalogues. This interplay between fixity and fluidity, formerly possible only on the scale of collections may now become a central feature of individual documents.

Conclution: Economy, Ecology, and Social Life

A good deal of the debate around the transition from old document forms to new ones has concerned reading from the new economy of documents to the old ecology. John Perry Barlow, Esther Dyson and others have argued that the economy of the document will change dramatically with the shift from atoms to bits, because the economic feasibility of conventional documents resulted from the relative ease with which paper-based objects could be controlled, which gave them significant exchange value.

Undoubtedly, the greater ease with which bits can escape control brings down exchange values and so will have profound effects on the way documents are used. But this focus on commercial role of fixed documents, on exchange value, perhaps misses the significant use value involved in many document transactions. We need to pay attention to the commercial life of documents -- but then given the way commerce works we almost inevitably will. What we are more prone to neglect, but what is crucial to its understanding and use, is the document's extensive social life. In the end, it seems unlikely that just because the economy of the document has changed, people will abandon it. Rather, while the document retains an active social life, and the Web suggests that it will retain this for quite some time, people will find ways to make it economically practical.

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Notes

1. Others, including the historians Roger Chartier and Carla Hesse and the philosopher Juergen Habermas, make similar claims.

2. Without copyright laws to restrain them, newspapers engaged in "cutting" and "pasting" or

"poaching" from one another and from other sources. Consequently, news traveled widely and rapidly. In a way, the papers functioned like proto-BBSs repeating new stories and old saws throughout the land.

3. Anderson points out that this feeling of community engages populations as ethnically, culturally, and socially diverse and geographically scattered as the population of the Indonesian archipelago.

4. Under the term "demassification," implications of this shift are discussed in J.S. Brown and P. Duguid, "Borderline Issues."

Further Reading

B. Anderson, Imagined Communities: Reflections on the Origin and Spread of Nations.

R. Anderson, Can Organizations Afford Knowledge. Xerox EuroPARC Paper.

J.S. Brown & P. Duguid, Borderline Issues: Social and Material Aspects of Design. Human-Computer Interaction, 1994 (9): 3-36.

J.S. Brown & P. Duguid, Universities in the Digital Age. Xerox PARC Working Paper, 1995.

R. Chartier, The Cultural Origins of the French Revolution, trans. L. Cochrane. Durham, NC: Duke University Press, 1991.

M. de Certeau, The Practice of Everyday Life, trans. S. Rendall. Berkeley, CA: University of California Press, 1984.

P. Duguid, Material Matters: The Past and the Futurology of the Book. In G. Nunberg, ed., The Future of the Book. Berkeley, CA: University of California Press, Forthcoming (1996).

E. Dyson, Intellectual Property on the Net, Release 1.0, December 1994.

S. Fish, Is There a Text in this Classroom? The Authority of Interpretive Communities. Cambridge, MA: Harvard University Press, 1980.

J. Habermas, The Structural Transformation of the Bourgeois Public Sphere, trans. T. Burger. Cambridge, MA: MIT Press, 1988.

C. Hesse, Publishing and Cultural Politics in Revolutionary Paris, 1789-1810. Berkeley, CA: University of California Press, 1991

J. Huizinga, America: A Dutch Historian's Vision from Afar and Near, trans. H. Rowen. New York: Harper Torchbooks, 1972.

H. Jenkins, Textual Poachers: Television Fans and Participatory Culture. London: Routlege, 1992.

R. Lanham, The Electronic Word: Democracy, Technology, and the Arts. Chicago: University of Chicago Press, 1993.

S. Leigh Star and J. Greisemer, Institutional Ecology, "Translations," and Coherence: Amateurs and Professional in Berkeley's Museum of Vertebrate Zoology, 1907-1939. In Social Studies of Science, 19:387-420, 1989.

D. Levy, Fixed or Fluid? Document Stability and New Media. In European Conference on Hypermedia Technology 1994 Conference Proceedings. New York: ACM Press, 1994.

J. Michalski, What's a Zine?, Release 1.0, June 1995.

W. Mitchell, City of Bits:s
Space, Place, and the Infobahn. Cambridge, MA: MIT Press, 1995.

N. Negroponte, Being Digital. New York: Knopf, 1995.

M. Reddy, The Conduit Metaphor: A Case of Frame Conflict in Our Language about Language.

In A. Ortony, ed., Metaphor and Thought. Cambridge, UK: Cambridge University Press, 1979.

S. Toulmin, Human Understanding: The Collective Use and Evolution of Concepts. Princeton, NJ: Princeton University Press, 1972.

J. Yates, Control through Coordination: The Rise of System in American Management. Baltimore, MD: Johns Hopkins University Press, 1989.

Hungarian translation of this article