Designing Libraries to be Learning Communities:
Toward an Ecology of Places for Learning

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At their best, libraries are centers for learning that create and sustain a sense of community far beyond their walls -- in towns, Universities, cities and even nations. What is it about libraries as places that can create and sustain learning communities, when they do? How might digital libraries be designed to become such centers for learning and, if they can, what would be their relationship to physical libraries?

In recognition that we live in a time in which all institutions that create and manage information are changing rapidly, and indeed entirely new kinds of virtual institutions may emerge in the near future, these questions might well be posed in more a general way as well. What is it about *places* that are conducive to the formation of learning communities, whether physical places like library buildings or virtual places like computer networks?

Answering these questions requires that one link information technology to a social vision, as would be required in designing a landscape or the architecture of a building. Unfortunately, because professional discourse tends to gain status from technical

terminology, the more technological the more prestigious, discussions of libraries and networks as public places has often been hidden. Yet social visions and tacit assumptions about learning in libraries are latent somewhere within technical discussions of the structure of OPACs and catalog record fields, and in information science within discussions of search engines, response time and user interfaces. In placing emphasis upon the social dimension, however, it may be useful to be careful using the technical term *information* as a generic functional concept encompassing both physical and digital libraries, at least until far more research is conducted on the nature and use of digital information.[1] For now, it is as important to acknowledge and describe *differences* in the way these two kinds of libraries may provide social contexts for learning, in order to discover the ways they might be designed to complement each other.

An Ecology of Learning Places.

When exploring the relationship between libraries and learning one discovers a gap between the professional discourse about libraries by librarians (e.g., library facilities, collections, information and public service), and the professional discourse about learning by educators (e.g., the classroom or laboratory, teaching or research). This is an important gap, for it makes it difficult for libraries to describe the relationship between library services and collections and the social utility of libraries for learning and other purposes. Within librarianship, one approach to this problem has been to describe and evaluate libraries in terms of outcomes or performance measures, that is, their impact upon users,

rather than evaluating the quality of libraries by counting the number of books, circulation of materials, number of staff, and so forth.[2]

But another approach might be to explore the relationship between information itself, whether printed or digital, and learning. After all, the word information was first used by the Scholastics as a term for learning, meaning "to place form into the mind." Yet the word 'information' alone does not solve the problem, for it means too many things. In information science and librarianship, discourse about information is most often about the management of things, the collection, organization, distribution and management of existing codified knowledge, information and data. Political discourse about information policy is generally focused upon the traditional institutions within which print has been managed – publishing, libraries and intellectual property law – and upon markets and international competition. Educational discourse about information and learning is often focused upon the places in which new knowledge is created: the social relations (e.g., teacher/student, apprenticeship), the institutions (e.g., schools, laboratories), and the tacit dimension of learning, as it flows from person to person through speech and non-verbal communication. An ecology of learning places must find a way to combine these perspectives, not by shaping a new landscape, but by discovering a strategy for balancing the dynamics of human psychology and technological architecture into the design of learning places.

Libraries are not the only institutions facing these questions, for 'the library crisis' is only one instance of the impact of information technology upon all institutions dependent

upon learning and research. For example, a special issue of the **California Management Review** on "Knowledge and the Firm" posed the problem this way for corporations: "How do we foster social processes for the exchange of information between individuals, one that promotes learning, research and innovation?"[3] This version of the question suggests that we might best focus our attention upon the way that libraries might foster the development of *communities of learners*, "the exchange of information between individuals," and less upon the provision of information to individuals, the traditional focus of library services.

Who uses libraries, and how are they used? Today we speak of people in the library as "users." The term 'user' suggests that it is the relationship to information technology that is central, just as the term 'reader' used to refer to a relationship to printed collections. While this is certainly a valid perspective, there is a certain social isolation implicit in each of these terms, suggesting that a library is a public place where strangers might gather to work side by side in peace, but remain strangers. And clearly, the creation of a public place within which such peaceful strangers might dwell is a substantial achievement in an urban civilization. But while some people can learn some things alone by reading books or computers, much learning is collaborative and tacit, and requires a social dimension as much as it requires access to information. While individual people do indeed come to libraries in order to find answers to informational questions (or perhaps to be entertained, overcome loneliness, or get out of the rain), information is often only a necessary yet insufficient condition for learning.

Beyond information alone, learning may require the exchange of information between individuals, and ultimately a sense of membership in a community of learners. How, then, does a library design and manage information to enhance communication among learners, to foster collaborative work and learning? While the epistemology of this question might best be explored by the discipline of cognitive psychology, an understanding of the political and social roles of libraries might best begin with an exploration of the nature and dynamics of public *places*.

Learning and a Sense of Place.

Let us postulate, then, that information management alone cannot make a landscape for the accommodation of knowledge, rather we must focus upon the use of information by individuals, and at a certain point, upon the individual's sense of membership in a learning community. This implies a sense of place – simultaneously a technical architecture and a sense of community. How do we construct such a sense of place?

On this subject, Japanese management theory offers the concept of Ba – the equivalent of our term "a sense of place" – that is useful in thinking about the future of libraries, because it extends the sense of place derived from geography and architecture to include other sources of a sense of place. Ba might reside in a physical place (such as a library, a classroom), or in a virtual place (such as a computer network), or in a cultural or intellectual place (such as that given by shared ideals or cultures), or in some combination of all of these kinds of places.[4] Even more importantly, such a sense of place

is thought to be the precondition for the creative life of any social group, and its design the ultimate creative act.

Therefore, however different they may be, print and digital libraries should be judged by the same standard, their ability to sustain a sense of place. We should ask: What is it about these different kinds of places that are, or are not, conducive to various kinds of learning? Given these concepts and postulates, and admittedly they are somewhat foreign to the tradition of libraries, two important questions about the design of the library of the future may be posed. First, what determines the quality of physical libraries and virtual communities as learning places, and what is their relationship? Secondly, how might digital information be designed to support learning?

What is the utility of virtual communities as learning places? If it is useful to think about the role of communities in learning, virtual community technology may be as important as digital library technology for the construction of the library of the future. Although virtual communities are still very young social experiments, and research on them is still very incomplete, early findings suggest very provocative questions for libraries.

For example, SeniorNet is an organization that uses digital network services to link together elderly people, many of whom live alone. Early studies of the use of SeniorNet network services suggests that it is not online information alone (such as bulletin boards and databases) that sustains a sense of community, but interactive services promoting communication (such as electronic mail and online discussion groups).[5] While the

concept of Ba suggests that shared information might provide a sense of place, the experience of SeniorNet suggests that person to person exchange of information is even more important. A digital library dedicated to the formation of learning communities must include both, providing the learner with both information and access to social networks which teach one how to use information. This strategy would resonate with Uri Treisman's findings about dropouts from school, which suggest that a sense of social isolation is the major cause of academic failure.

How can information resources be designed to foster a sense of place? We do not yet know very much about the nature and use of digital information, and its implications for human understanding and organization, except that it may well be revolutionary. Yet the vocabulary with which we discuss digital information has been primarily derived from our experience with printed documents, including books, journals and newspapers, each of which includes numerous highly refined genres. But digital information is still in an early stage of innovation. In many ways it still imitates print genres (consider how little of the writing on the World Wide Web differs from writing in print), and only now is beginning to develop genres that require the unique characteristics of digital information (e.g., multimedia, collaborative writing, and electronic mail).

Discussions of print may successfully focus upon the management of things or commodities, because the social arrangements for information management of print are well established, and have become tacit knowledge. But it is too early to discuss digital information as a problem of the management of things, not least because it is dangerous

to allow the discussion of political questions to be merely tacit within technical problems. Moreover, many of the traditional virtues of print are yet to be achieved by digital genres, such as quality, provenance, the organization of information, and preservation. Thus sociologist Manuel Castells[6] analyzes digital documents as "information flows," rather than as things or commodities, in order to place the focus upon social and political issues like equality, participation, free speech, privacy and confidentiality. These issues combine technical architecture with questions of social vision and political justice, thus are among the constituent elements of a sense of place.

Although each of these questions is worthy of an extended theoretical discussion, given this early stage of innovation it is more practical to introduce them through brief case studies. Exploring the sociology of virtual communities will serve to introduce issues concerning the possibility of building digital libraries that include learning communities. The example of the World Wide Web (the 'Web) will serve to introduce issues concerning the social nature, use and value of digital information.

Can Virtual Communities Be Places?

Virtual community is the term used to describe the feeling of intimacy and social solidarity felt by participants in computer mediated communication (CMC), when using electronic mail, bulletin boards, internet relay chat (IRC), MUDs and MOOs, computer games and other software. The first explorer of virtual communities, Howard Rheingold, says, "IRC has enabled a global subculture to construct itself from three fundamental

elements: artificial but stable identities, quick wit, and the use of words to construct an imagined shared context for conversation."[7] He then poses these questions about the architecture of virtual communities: "What are the minimum elements of communication necessary for a group of people to cocreate a sense of community? What kinds of cultures emerge when you remove from human discourse all cultural artifacts except written words?" Although "virtual" community is surely a very different experience from the traditional experiences of community, at this point it is clear that new forms of social solidarity are emerging in cyberspace, even though they are based solely upon the exchange of digital writing in real time.

Sociologists Mary Virnoche and Gary Marx have differentiated three kinds of virtual communities, each with its own quality as a place. [8]

1. *Community networks.*

Community networks are geographical communities which use various kinds of digital communications to extend participation, such as electronic mail, internet relay chat (IRC), bulletin boards and 'Web pages. Examples of community networks include:

- municipal governments using networked communication to involve citizens in political deliberation (for example, the Boulder, Colorado Community Network at http://bcn.boulder.co.us);
- corporations using electronic mail and teleconferencing;
- scientists and engineers using software for collaborative work;
- and classrooms using Web page and electronic mail to encourage discussion outside of classroom hours.

Clearly the strongest sense of community requires physical proximity and frequent face to face interaction, but *community networks* may extend this sense of participation in useful ways by making information more accessible. One consequence of this finding is that digital libraries supporting community learning are more likely to complement physical libraries than to replace them.

2. Virtual extensions.

Virtual extensions sustain a sense of community among a group of people separated by geographical distance but who have face to face interaction intermittently, by using shared information resources and computer mediated communication. Librarians are an excellent example of a profession whose members meet often, but who also extend this sense of community through daily computer mediated communication. Biotechnology is an example of a scientific field in which the rapid advance of research and technical complexity of the field requires that advances are often made by large teams using software for collaborative work rather than geographical proximity as their social glue. Sociologist Walter Powell says: "In the biotech industry, collaborative networks are becoming the "places" where important intellectual activity occurs…These virtual teams point to the future shape of knowledge work in general, which some predict will be accomplished by widely dispersed groups and individuals woven into communities of practice by networks, groupware and a complex common task."[9]

Virtual extensions are a sense of place which may be created by collaborative work on a shared problem, one requiring occasional face to face meeting for the exchange of tacit

knowledge, but which is sustained by a shared work governed by a sense of shared profession and problem solving.[10]

3. Virtual communities

Virtual communities in the strict sense, then, are groups of strangers separated by geographical distance, but sharing a common interest, expressed by an ongoing participation in computer mediated communication. Good examples of virtual communities are Usenet discussions[11], Howard Rheingold's description of The Well in **The Virtual Community**, or the most famous example, Xerox PARC's social experiment with MOO technology called Lambda Moo.[12] Virtual communities in this specific sense may have relatively little stability over time, and relatively more spectators than participants, and yet are of interest because they are a new form of social group that is robust even if its members have never met, are separated by great distances, and possess significant cultural differences.

Virtual communities have an anonymous quality, perhaps, but this does not prevent them from forming a sense of belonging among strangers from around the world. They are dependent upon responsiveness and a shared interest in a sustained conversation on a topic of mutual interest rather than physical proximity or shared work or common problems. They are most likely to be useful to those sharing interests or problems; thus many of the most successful sites provide scarce information and advice about very specialized topics, or perhaps simply a place to talk about a controversial topic without risk. For digital libraries they might be useful in linking citizens to those in other cities or nations.

How do virtual communities create and sustain a sense of place, when they do? According to sociologists Barry Wellman and Milena Gulia, social relations in cyberspace have the following characteristics[13]:

- They tend to be narrow and specialized, rather than general;
- They have a social structure, based upon a sense of reciprocity, and social status in giving good answers;
- Their anonymity fosters communication among a wider diversity of people than most face to face communities;
- And, they tend to be responsive in an immediate manner.

On the other hand, unlike traditional communities, they are not intimate, nor long term, do not require frequent contact, and do not have depth over many social contexts or concerns.

And yet, Wellman and Gulia argue that few social collectives in the modern urban world can be said to be more communitarian than virtual communities. They estimate that the average North American has 1000 acquaintances, including six intimate relationship and perhaps only 50 strong friendships that might be described as constituting a community. Yet the other 950 acquaintances are important sources of information, support, companionship and a sense of belonging not unlike those in virtual communities. The social function of virtual communities might best be compared to the casual acquaintances of modern urban life, they argue, not to the *gemeinschaft* of medieval villages or even social life in small towns or to families.

Today digital libraries are designed for individual users, but they might well be designed for virtual communities in each of the three senses defined above, but thus far the two technologies have not been linked. Yet if libraries are to foster learning, virtual community technology offers a new means to link information resources to learning communities, and to link libraries to civil society in new ways.

What are Information Landscapes?

Digital libraries are often described as "information resources," yet it is difficult to use digital information, for it provides no sense of place. It has no boundaries, for in principle every networked information resource may be linked to every other, and indeed many encompass the globe. The structure of digital information is defined by technical standards, but unlike print or other media, there is no authority in cyberspace that might determine the quality of information; even political regulation of cyberspace by national governments is very difficult, given its global scope, without international treaties. Information is not a landscape; it is a remarkable wilderness, needing the vision of a technological Capability Brown.

And yet, if digital information is a wilderness, we tend to judge it by the standard of printed information, which has evolved quality standards, genres, authority structures and institutional contexts over the past five hundred years. Digital information is a new kind of resource, still in the early stages of innovation. The World Wide Web might serve to

illustrate some of the remarkable properties of digital information, some of the problems in creating a sense of place in cyberspace, and some of the current attempts to create a landscape for it. Formally the 'Web might be described in these terms: [14]

- It is a medium for publishing, now equivalent in size to a library of one million volumes, and doubling in size yearly;
- It uses a rhetorical structure based on HTML, or hypertext, allowing any text to be linked to any other;
- It is a multimedia text, now mostly words and numbers, some fixed and some dynamic, as well as images;
- It is the largest information resource ever created, written by seven million authors; and,
- It is accessible from any network node anywhere in the world, most of it without charge.

A text written collaboratively by seven million authors is a remarkable, even historic event, but without structure it is no more a library than the sum of telephone calls or radio broadcasts made each year.

For this reason, digital libraries tend to include only citations, abstracts and indices of printed information, and digitized versions of printed documents. Yet more and more kinds of information are being invented each year which can only be created and used in digital form, such as scientific visualization, animation, collaboratory data and analysis, simulations, digital arts, and the largest information resource ever created, the 'Web itself. A true digital library would include the New World of digital information, if it

contained the tools necessary to organize and search it. Four such projects are worthy of special mention here, if only to illustrate the scope of the problem of building digital libraries for learning.

1. XML.

The most frequent prediction about the future of the 'Web is that the problem of quality will be solved by electronic commerce: public information will be free but unstructured, and high quality information will be provided fee for service only. But a sense of place is even more vital for electronic commerce than for libraries. Thus new software is being created to make it easier to search for information, to make the 'Web more personal by creating a sense of virtual community, to make it less anonymous by recognizing each user and remembering his or her interests. One example is XML, which is to be far more complex than HTML in supporting a sense of participation and community. XML will resemble SGML in providing complex and sophisticated editing capability for electronic publishing, yet go beyond publishing to support a sense of personal contact between buyer and seller, often described as "a shopping experience." XML is only one example, but a telling one because it requires electronic commerce software to link information to a sense of community. If commerce has set this as a requirement, can libraries not do so?

2. Searching and retrieval.

Cyberspace is explored by search engines, although librarians know that most people do not understand how to construct a logical search of online information, and even if they do, no search engine encompasses all relevant information, and no two provide the same response to the same query.[15] Search engine companies (e.g., Yahoo! or AltaVista) attempt to catalog the 'Web, but unlike libraries, they do not share catalog structures,

standards or records, thus do not provide standard responses. Considerable effort is being made to improve search technologies, especially through pattern recognition and content analysis.

A second strategy is inductive and sociological, to discover the structure of the 'Web by analyzing its use. Unlike reading a book, the structure of texts on the 'Web is shaped by the actions of the reader, who links information in new patterns, thereby leaving traces which can be collected and archived. As in a wilderness, frequently used traces become trails, then roads; mapping these roads by "link analysis" is the first attempt to create a social geography or roadmap of the 'Web. Similarly, "collaborative filtering" software indicates quality by allowing each reader to study the information preferences and choices of groups of people with the similar interests and backgrounds. Unlike cataloging, these strategies seek to understand the social structures which guide the use of the 'Web, rather than the intellectual structure of its content.

3. Archiving the 'Web.

Yet the 'Web is also ephemeral, and cannot be treated as information unless it is archived.[16] Because the 'Web is doubling yearly, the typical 'Web page is only two months old. But only two-thirds of host machines are likely to be accessible on any given day, and most 'Web pages disappear within a year. While paper is a relatively stable medium for the preservation of information, digital media are relatively unstable, less by virtue of their physical vulnerability (e.g., ferro-magnetic tape) than the pace of technological change and the obsolescence of both hardware and software. Alexa

Internet has created an archival database of 'Web pages that are no longer accessible, which now includes ten terabytes of data (see http://www.alexa.com).

4. Genre.

In a book titled **Bad Aboriginal Art** anthropologist Eric Michaels pointed out that primitive art cannot be judged to be 'good' art unless it might also be judged to be 'bad.'[17] The same might be said of digital information, for it is always by definition innovative and new without necessarily being useful. In the world of print, there are a number of contexts within which information may be judged to be good or bad. Most importantly, the literate reader has been trained to recognize the genre of information and apply the relevant standards. But in addition, the provenance of the work is defined by the reputation of the author, of the publisher, and the reviewers. But there are no such standards or contexts within which to judge whether a 'Web page is good or bad, well written or not, useful or not. This problem of 'genre' is characteristic of all electronic media, but it is distinctly interesting in the case of digital information because, like print, it is *written*, but like television, it is *visual*.

Conclusion.

This paper began with the goal of "accommodating learning" to the digital landscape, and discovered that technical discourse obscures the ground of such an accommodation, whether that of librarians or of information scientists. Moreover, the design of the digital library reflects the practice of print libraries in assuming that the learner is a self-sufficient individual. Many learners are self-sufficient, or come to the library looking for information rather than learning ("When is the next bus to London?") or entertainment ("Where are the novels?"). But many kinds of learning require participation in a learning

community, particularly when one needs to discover the tacit dimension of a new field of knowledge. Moreover, much of modern intellectual life requires the cooperation of a relatively large number of people in cooperative learning and discovery, or collaborative work. On either ground, it seems reasonable to design a digital library for the use of communities of learners, as well as for individual "users."

Based upon that assumption, the paper explored the early research on virtual communities. Two important discoveries from that research that might have bearing upon the design of digital libraries for learning communities are:

1 Virtual communities seem to be relatively promising places within which various kinds of learning relationships might grow; and,

2 Robust virtual communities will depend upon occasional face-to-face meetings within the physical library.

Equally important is the proposition that a sense of place might grow from a number of different kinds of shared experiences, and that every kind of learning place should be judged by its success in enabling those who live there to exchange information in a creative manner.

Finally, the paper briefly examined the early research on the nature of digital information itself, using the 'Web as an example, concluding that digital information is in a relatively early stage of evolution, and is not well designed for the use of groups. For this reason digital libraries have tended to be tools for the use of printed information, or digitized print, leaving the realm of information designed for new media in the hands of the

entertainment industry and computer scientists. The information landscape within the digital library like one of the early forts in the New World, a secure foothold in the wilderness, but requiring the presence of farmers and agriculture far more than landscapers.

Notes

1 In the U.K., see, for example, the systematic research program "Virtual Society? The Social Science of Electronic Technologies," sponsored by the Economic and Social Research Council (ESRC), directed by Professor Steve Woolgar of Brunel University. In the U.S., see the NSF workshop on the Social Aspects of Digital Libraries, at http://www.gslis.ucla.edu/DL/UCLA_DL_Report.html. Note that this, and all Web addresses in this paper, may be found at the Internet Archive if they are no longer available on the Web, which in turn may be found at http://www.alexa.com.

2 See, for example, The Proceedings of the 2nd Northumbria International Conference on Performance Measurement in Libraries and Information Services, 7-11 September 1997.

3 **The California Management Review** 40(Spring 1998) Number 3. "Special Issue on Knowledge and the Firm," edited by Robert E. Cole.

4 Ikujiro Nonaka and Noboru Konno, "The Concept of 'Ba': Building a Foundation for Knowledge Creation." **Ibid**. pp. 40-54.

5 Mary S. Furlong, "An Electronic Community for Older Adults: The SeniorNet network." **Journal of Communication** 39 (Summer 1989) pages 145-153.

6 Manuel Castells, **The Rise of Network Society** (Oxford, Blackwell Publishers, 1996). See especially Chapter 6, "The space of flows," pages 376-428.

7 Howard Rheingold**, The Virtual Community: Homesteading on the Electronic Frontier**. (New York: HarperCollins Books, 1994), page 176.

8 Mary E. Virnoche and Gary T. Marx, "'Only Connect'—E.M. Forster in an Age of Electronic Communication: Computer-Mediated Association and Community Networks." **Sociological Inquiry** 67(February 1997) No. 1, pp. 85-100.

9 Walter W. Powell, "Learning from Collaboration: Knowledge and Networks in the Biotechnology and Pharmaceutical Industries," in **California Management Review**, **op. cit**., pp. 228-240.

10 For a review of computer supported collaborative work (CSCW) see Jonathan Grudin, "CSCW: Its History and Participation" on the 'Web at http://www.ics.uci.edu/~grudin/CSCW.html. A useful study of the use of CSCW in the sciences is John P. Walsh and Todd Bayma, "Computer Networks and Scientific Work," in Sara Kiesler (editor), **Culture of the Internet** (New Jersey: Lawrence Erlbaum Associates, Inc, 1997) pages 385-406.

11 See Malcolm R. Parks, "Making Friends in Cyberspace," **Journal of Computer Mediated Communication** at http://www.usc.edu/dept/annenberg/jcmc.

12 See Julian Dibble, "A Rape in Cyberspace: How an Evil Clown, a Haitian Trikster Spirit, Two Wizards, and a Cast of Dozens Turned a Database into a Society," in Mark Stefik, **Internet Dreams: Archetypes, Myths and Metaphors** (Cambridge: The MIT Press, 1996), pages 293-316. Lambda Moo may be explored by Telnet at telnet://Lambda.parc.xerox.com:8888.

13 Barry Wellman and Milena Gulia, "Net Surfers Don't Ride Alone: Virtual Communities as Communities." **Communities in Cyberspace**, edited by Peter Kollock and Marc Smith (forthcoming, University of California Press).

14 A fuller version of this argument is in Peter Lyman and Brewster Kahle, "Archiving Digital Cultural Artifacts," D-Lib Magazine (July-August 1998), at http://www.dlib.org/dlib/july98/07lyman.html.

15 Steve Lawrence and C. Lee Giles, "Searching the World Wide Web," Science 280(3 April 1998) pages 98-100. See also http://www.research.digital.com/SRC/personal/Krishna_Bharat/estim/367.html.

16 For a dialogue among technologists, librarians and museum professionals on the technical agenda for a digital archive see the Time and Bits Web page and discussion at http://www.gii.getty.edu/timeandbits.

17 Eric Michaels, **Bad Aboriginal Art: Tradition, Media and Technological Horizons.** Minneapolis: University of Minnesota Press, 1994.