Published in the Proceedings of the Symposium on Directions
and Impacts of Advanced Computing (DIAC 94), Cambridge, MA

Metaphors along the Information Highway

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It is absolutely essentially that the metaphors of use surrounding the NII and its component services be examined critically. We need to do this for two reasons. The descriptions and explanations of the NII and its component services will affect the societal debate around implementation and social impacts. Some of the metaphors used to describe the NII, however, distort the real effects and possibilities inherent in the NII.

The NII's use is likely to have dramatic effects on our notions of democracy, eduction, community, equality and other important features of our society. Nonetheless, the terms of acceptance and adoption for the NII are not yet set societally. It is important to do this critical examination now, before the metaphors and terms get permanently established.

With the advent of mass-market networks and information utilities, there has been a concomitant arrival of new societal metaphors. We hear such terms as "virtual community", "digital library", "collective memory", and "information highway" bandied about by newscasters, academics, and politicians, and while these metaphors shape our understanding of the new phenomena, they are hardly examined for their efficacy or truthfulness.

An examination of these metaphors is warranted by necessity; I will argue below that some are dangerous. If we apprehend new technological and social possibilities through these metaphors, these metaphors shape our understanding and so our future. As Lakoff and Johnson (1980) wrote:

> ...metaphor is typically viewed as characteristic of language alone. ...on the contrary, metaphor is 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. 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. ...the way we think, what we experience, and what we do every day is very much a matter of metaphor. (p. 3)

This premise of analogical reasoning was also the basis for Postman's (1992) criticism of information technologies. Although Postman borders on the irascible when discussing the adverse effects of computerized information technologies, he correctly notes such systems affect our method of thinking. Technologies carry with them new meanings for our social fabric:

> ...new technologies...alter those deeply embedded habits of thought which give to a culture its sense of what the world is like...such changes are expressed in changed meanings of old words.... (p. 12)

Through this alteration in our everyday discourse, we not only apprehend new technologies, we reshape our understanding and devotion to existing technologies, values, and social constructions. Postman argues that we can prevent this reconstruction only by avoiding the adoption of the technology (i.e., the technology has inherent properties).

This paper, however, argues that adoption of some new technologies may be an irreversible fact, and avoidance may not be possible. The growing movement towards some sort of commercialization of mass-market information utilities is no doubt such a case. However, the terms of adoption are not set in advance, and we should consider how we socially construct our understanding of these mass-market information services and utilities.

Accordingly, the remainder of this brief paper considers two metaphors -- "organizational memory" and "digital library" -- as examples of entire classes of metaphors employed to explain the new information utilities. (I classify these metaphors not by their explanatory similarities, but by their outcomes.) There are other classes of metaphors as well, but these two are the most critical to examine. I hope to show that such classes of metaphors must be considered carefully for their efficacy and truthfulness in explaining and interpreting the new information systems.

The first metaphor considered here is that of "organizational memory". Organizational memory has been an area of growing research interest over the last few years. Different researchers and disciplines use slightly different terms (e.g., "collective memory" or "community memory"), but any of these similar terms would provide similar results in the analysis below.

Of particular interest here is that the use of the metaphor within the context of technology evokes a set of assumptions about that technology. "Memory", in this context, evokes assumptions of human memory with all of its attributes. For example, human memory is instantly available, and by analogy, information within an organizational memory system should be immediately accessible in the same effortless manner. The addition of technological augmentation implies the correction of some human problems such as corruption of memory over time, incomplete memorization, and even the inappropriate retention of memory that might interfere with future learning. Few people assume that the technology exactly mirrors human memory; nonetheless, the metaphor appears to instantly persuade without critical examination. (See Ackerman 1994 for a more detailed analysis, based on field study results, of this idealization.)

The important point is that the metaphor is used to evoke some deep desire, but *no current technological solution can satisfy the metaphorical evocation.* Computer science has promised too much. While the metaphor works to pull people in, it also carries the seeds of its own counter-reaction. The software engineering, market, or academic audience will eventually see too large a gap between the promise of the evoked metaphor and the actual technical possibilities. Various reactions may ensue. In time, the metaphor may be forgotten (such as with "office automation" turning into "office systems"), the gap may be ignored or institutionalized (as with "artificial intelligence"), or the interest in the area may vanish or sharply diminish (as with "tutoring systems" and "expert consulting systems").

In short, the metaphor in "organizational memory" plays on an inherent interest and need, but there is a fundamental gap between the desire and reality. To step beyond the specifics of the term "organizational memory", there exists a class of metaphors with a single distinguishing characteristic: the metaphor suggests that capabilities present in social or human reality (such as memory) are also present in the technology under consideration.

This class of metaphors contrasts with the second class, typified by the term "digital library". In the first class, as mentioned, the term gains additional significance through assumption; the technology suffers in comparison to the social reality evoked. In this second class, however, our social reality suffers as a result of the technology. The use of metaphor constricts our understanding of social reality, and in doing so, may eventually change the social reality itself. This process can be seen with the term "digital library".

One should consider "digital library" as a term under construction. One particularly utopian vision of a "digital library" stated:

> By the end of this century large scale digital libraries containing the collective legacy of human knowledge will be accessed on-demand over gigabit networks forcing what will be literally the democratization of information. (Masullo 1993)

Utopian visions mislead when they ignore social realities and exaggerate the positive outcomes (Kling 1990). A utopian vision may be quite problematic in itself for policy. For our purposes here, however, the interest lies not in the utopian vision, but in the use of the metaphor of "library". In the process of implementation, this metaphor became important and problematic. Of particular interest here is how the particular context of funding changed the social connotations inherent in the term "library".

The recent call for proposals by the NSF, ARPA, and NASA sparked considerable interest by researchers and commercial ventures. In the workshops preceding this call, many participants analyzed libraries in terms of their social functions (Fox 1993). For example, Winograd noted that the use of the term "library" was misleading since the technology being considered was not bound by physical place. Nonetheless, he argued that "library" included communicative and collaborative functions (Fox, p. 86). As another example, Wieser is quoted as saying, "Using digital information should be as pleasant, refreshing, [and] enjoyable as using a community library today" (Fox, p. 95).

However, in discussions about the call (e.g., the NSF and ARPA briefing in the San Diego about the call), there has been a noticeable lack of interest in the digital library's connection to the social world. Interest has been clearly focused on the technical. The library and information science community has been largely excluded. Easy and constant access, it is argued, is possible only through technical solutions, and by lack of inclusion of other considerations, it is further argued that this is all that is socially required.

Unfortunately, the "library", as we know it, is not merely a place of information storage and retrieval. The library as place also includes many social elements. People gather and socialize in the library. Academic libraries provide places to study and meet. Community libraries also provide social welfare services. Librarians not only provide filtering, training, and information gathering capabilities, they also provide a human touch in the process of information seeking and use.

There is nothing problematic about a technically-oriented "digital library" in itself. Increased access to information sources is to be encouraged. However, this current use of the "library" metaphor considers only what is possible with specific types of technology, and then *restricts*

the meaning of the metaphorical referent to that narrow conception. That is, we do not see the technology as restricted because we redefine the social phenomenon to include only what is technically possible. "Library" is to include only individual information-seeking.[1] We see only what is possible through technology; in the case of "digital library", we restrict ourselves to what is feasible with only a subset of possible technologies.

In the first class of metaphors, the technology suffered in contrast to the social realities. The existence of marketing "hype" becomes critical when large policy decisions are potentially based on a lack of understanding. However, the second class of metaphors is far more dangerous. The first class hides reality but pays homage to it. The second class distorts the language used to describe our social reality, and in doing so, corrupts our entire understanding of our social environment.

In summary, I have argued that the metaphors used to explain the new information utilities and resources will structure our understanding of those utilities and resources, and more importantly, they may structure our understanding of other social phenomena as well. For two classes of metaphors, this structuring is problematic. One class of metaphors, typified by "organizational memory" or "community memory", hides the real restrictions of a technology by claiming attributes of human or social phenomena. The other class of metaphors, typified by a specific use of "digital library", restricts the social or human phenomena to only that which is possible through technology or even specific technologies. The second class of metaphors is especially dangerous if accepted uncritically.

Both types of metaphors exist not only in policy discussions and arguments, but also in articles and reports used by the public in understanding the large-scale technical possibilities and the potential societal changes. Metaphors like "virtual community" and "information highway" summon great explanatory power. These metaphors not only provide explanatory power, they also provide avenues for distortion and misrepresentation. This paper has argued that in our desire to elucidate the possibilities to the public and to ourselves, we must weigh any explanatory power against the potential error.

References

Ackerman, Mark S. 1994. Definitional and Contextual Issues in Organizational and Group Memories. *Proceedings of the Twenty-seventh IEEE Hawaii International Conference of System Sciences (HICSS 94)*: 191-200.

Fox, Edward A. 1993. Source Book on Digital Libraries. Virginia Tech, Department of Computer Science, TR 93-35.

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[1]An analogy here can be made to the term "automated teller machines" (ATMs). Originally, one might have considered "ATM" to be a metaphor of the first class. That is, ATMs could not approach the functions and capabilities of a human teller, but the marketers of these machines wanted to evoke the idea of a human teller nonetheless. In a bank, human tellers provide the basis of a relationship between the bank and the customer. However, some banks have restricted their human tellers to nearly the same level of function as the ATMs, removing the possibility of a relationship and allowing users only a series of commodity transactions. ATMs are efficient and useful, but they do not denote the full extent of "teller" and the term's possibilities.

Kling, Rob. 1990. Reading "All About" Computerization: Five Common Genres of Social Analysis. In *Directions in Advanced Computer Systems*. Edited by D. Schuler. Norwood, N. J.: Ablex.

Lakoff, George, and Mark Johnson. 1980. *Metaphors We Live By*. Chicago: University of Chicago Press.

Masullo, Miriam J. 1993. Announcement for the CIKM-93 Workshop on the Role of Digital Libraries in K-12. Usenet news.announce.conference.

Postman, Neil. 1992. *Technopoly*. New York: Vintage.