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LIS503: Use and Users of Information
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Spring 2006

Wayfinding: A Short Literature Review

*The riverbank makes a very good road,
The dead trees will show you the way,
Left foot, peg foot traveling on,
Following the drinking gourd.*
--From the American folksong "Follow the Drinking Gourd"

*And time with us was always popular.
When have we not preferred some going round
To going straight to where we are?*
--From W. H. Auden's "Our Bias" (1940)

The phenomenon of wayfinding in the context of library and information science (LIS) has been inadequately explored. The only book in LIS that covers the topic, mostly from the perspective of visual communication, is *Sign Systems for Libraries: Solving the Wayfinding Problem* (Pollet & Haskell, 1979). Articles on wayfinding, particularly in scholarly journals, are also rare. As of mid-February 2006, a quick search in *Library and Information Science Abstracts* under the keyword "wayfinding" produces twelve hits, fewer than half of which are peer-reviewed pieces. On the other hand, the same search performed in *ISI Web of Knowledge* (admittedly a larger aggregator) gives 78 results. Since its coinage by Kevin Lynch in his 1960 book, *The Image of the City*, wayfinding has been investigated at length in fields such as architecture, computer science (specifically human-computer interaction [HCI]), consumer economics, and environmental psychology: the behavior is broken down into observable activities, and methodologies such as surveys, field experiments, and brief interviews—all of which measure how well or how poorly people find their way—are applied. This literature review considers research done on wayfinding in the real world, on the Web, and in virtual environments (VEs). Prefaced by a discussion of the intrinsic semantics of the term (to trace its likely original connotation), the review addresses the major contributions on wayfinding to LIS,

followed by a survey of some of the studies done in other fields, in an effort to begin to understand how to orient the subject for more extensive research in LIS.

Early in *The Image of the City* Lynch makes mention of the Polynesian islanders' ability for "unaided navigation," or wayfinding in its purest sense. In some societies wayfinding is as old as the stars. Before the invention and use of navigational instruments such as the compass and, in recent years, global positioning systems (GPSes), aboriginal peoples such as the Inuit relied on their knowledge and observation of nature, weather, animals, tidal changes, and the night sky to guide them (Aporta & Higgs, 2005). To wayfind means to orient oneself in one's natural surroundings (i.e., not the built or developed environment)—to apply what is seen and sensed in nature toward the goal of reaching a certain destination. (The first epigraph to this paper, taken from the folksong "Follow the Drinking Gourd," about the Underground Railroad that fleeing slaves followed north to secure their freedom, illustrates this point.) Also worth noting is that for most of these aboriginal cultures, the *ways* of wayfinding take a long time to understand, if not master; wayfinding is not wayfinding unless at least two things are factored in: the inherent difficulty of becoming skilled at it and the realization that even those most practiced at wayfinding are vulnerable at any time to a loss of direction (Lynch, 1960). There are so many features about the natural environment to bear in mind and recall (features whose changes one also must consider), that repeated navigational experiences are required to learn wayfinding (Aporta & Higgs, 2005). Typically, in aboriginal tribes experienced elders model the process for novices over extended periods of time, as if the sustained training and mentoring were intended to embed wayfinding to make it inextricable from a sense of self.

The foregoing gloss on the "original" cultural milieu of wayfinding functions as a point of departure for discussing it in the framework of the built environment, where both similarities to, and differences from, natural wayfinding can be discerned. The built environment references anything constructed by humans or managed by them: these include, for example, not only physical, real locations (e.g., buildings, city streets, parks, or forest preserves) but also virtual contexts such as Web sites, electronic databases, or video games. In these surroundings wayfinding denotes navigating one's way but typically via man-made routes and landmarks (instead of via nature, stars, and the sun), such as hallways, sidewalks, statues, or traffic lights—in both their real and virtual iterations—or using the "bread crumbs," navigations bars, or anchors of a Web site. Yet, whereas "early" wayfinding is understood as a skill that is many months, if not years, in the making—since the natural environment is teeming with variables—"modern" wayfinding has incumbent on it certain

expectations of rapidity and effortlessness, mainly because the routes and landmarks of built environments usually are planned or, at least, not prone to swift or frequent change. The studies about to be discussed were undertaken, generally because in a variety of contexts modern wayfinding either takes too long or is too complex, or both.

In their study of real-world wayfinding in *Sign Systems for Libraries*, Pollet and Haskell explore how a library visually communicates what is inside it to the patrons negotiating its interior. While their book addresses mostly the planning, design, implementation, and assessment of visual guidance systems in libraries, its initial section reviews theory and research on wayfinding. Factors such as the physical environment, patron needs, and patrons' psychological conditions, including "information overload and stress" (Pollet & Haskell, 1979. p. 9) and "overconfidence in decision-making" (Pollet & Haskell, 1979. p. 11), are considered briefly for the way they affect users in a library. That is, there should not be too much signage (possibly overwhelming the user), nor should there be useful wayfinding guidance in one part of the library and little or none in others (the imbalance erodes users' expectations and confidence). Given the current, expanded literature in LIS on topics such as overload, avoidance, decision-making, and even problem-solving, wayfinding could be revisited in relation to one or some of them to deepen an operationalizing of the concept. Also discussed in Pollet and Haskell is the relationship between wayfinding and cognitive mapping, defined in the field of psychology as peoples' experiences of forming mental pictures of their environment. Cognitive mapping involves dividing one's sense of a space into landmark, route, and survey knowledge (the last defined as familiarity with a space as a whole, which is what maps provide), as well as making decisions about direction and executing them. Applications of cognitive mapping to an understanding of human wayfinding behavior is confirmed by, and expanded upon in, other studies of real-world wayfinding (Baskaya, Wilson & Özcan, 2004; Chebat, Gélinas-Chebat & Therrien, 2005).

In the LIS literature on virtual wayfinding, two investigations stand out: one looks at wayfinding in electronic databases (Kerr, 1990), while another, more recent study takes up the topic in the context of consumer search behavior on the Web (Hodgkinson, Kiel & McColl-Kennedy, 1999). Kerr asserts the prime importance of rendering wayfinding information as visible as possible. As one method for measuring the effectiveness of database wayfinding, he has participants map out their movements in an electronic catalog. The result: quick searchers produced more intricate, pictorial representations than slow searchers, who used words rather than graphics to convey their comprehension of the database. Like Pollet and Haskell, Hodgkinson et al. apply the idea of

cognitive mapping to wayfinding but in a Web context. A chief conclusion of their investigation is that the Web's less-than-transparent topography does not enable good direction-giving toward sites (unlike in real-world wayfinding, where one can say "turn left at the second traffic light"); on the Web, one almost always needs the exact site address, or URL. As the authors show, diagramming the search patterns of consumers as they move from search engines to portals to sites, going between and among these places, enables a visualization of wayfinding that could be helpful in training people to be better navigators.

An investigation of wayfinding in LIS literature cannot but also include a reference to S.-J. Chang's and R.E. Rice's seminal article "Browsing: A multidimensional framework" (1993), mainly because it points up the need to treat wayfinding more seriously in LIS. Chang and Rice examine browsing by posing three basic research questions in the context of six different disciplines, one of which is that of wayfinding and environmental design. (The research questions consider what defines browsing, what influences it, and what happens as a consequence of browsing.) Browsing as it relates to wayfinding marks an activity not unlike scanning, which itself falls in the realm of "environmental perception and cognition"; an example of "environmental browsing as a perceptual experience" would be sightseeing, for instance, which can involve scanning one's surroundings in order to attain an overall idea of them (Chang & Rice, 1993). Partly as a result the authors conceptualize browsing not only as an act that can be undertaken with no particular objective in mind but also as a goal-driven pursuit. At one point they equate browsing with wayfinding, because both "can be facilitated or constrained by architectural and display design" (Chang & Rice, 1993). One of the most important points Chang & Rice make, however, is that as virtual or electronic libraries become the norm (which, since the publication of this article thirteen years ago, they indeed are now), the work that is done in the field of wayfinding and environmental design has the potential to improve electronic browsing and the design of the systems that facilitate it. Wayfinding research, as will be seen below, has taken off in the HCI and VE fields, but it has yet to be applied as closely to the study of activities that are performed in a digital library environment, such as browsing.

Like the LIS research just highlighted, the non-LIS literature on wayfinding can be divided into real-world and VE studies. In architecture the seminal text on real-world wayfinding, after Lynch's *The Image of the City*, is *Wayfinding in Architecture* (Passini, 1984). For Passini, wayfinding is spatial problem-solving, and to set his book on this particular theoretical path, he writes his first chapter on labyrinths and being lost in a space. Labyrinths and mazes are constructed intentionally to disorient (but also to challenge) people, and as such they can cause frustration, distress, and

inadequacy; buildings often do the same thing. Others since Passini also have noted the emotional costs of disorientation. To remedy such a state, Correa de Jesus asserts the need in architecture for cues of reassurance that one is on the right path (1994). In their study of wayfinding inside two Turkish polyclinics, Baskaya et al. discover that asymmetry in buildings aids people in wayfinding better than symmetry; it is harder to discern where one is when everything looks the same—when the structure has little or no differentiation within it (2004). Nonetheless, disorientation can sometimes be advantageous in wayfinding. In their study of patients with early dementia, Chiu, Algase, Liang, Liu, and Lin note that becoming lost presents an opportunity for strategizing wayfinding anew, perhaps to detect a shortcut or gain a new sense of a path (2005).

In addition, there are studies that consider the effects of gender on wayfinding. In their exploration of the behavior in a cross-cultural sample consisting of men and women from Hungary and the United States, Lawton and Kallai inquire about childhood wayfinding experiences and find that more men than women are able to report having had them, which may explain why men tend to be better wayfinders than women—they likely have been doing it longer (2002). When wayfinding by themselves, women also feel less safe than men; this feeling exacerbates anxiety about the process and constrains them from strategizing wayfinding more effectively (Lawton & Kallai, 2002). In an investigation on gender and wayfinding in shopping malls, Chebat et al. find that male shoppers make more effective use of landmarks, while female shoppers typically turn to people for wayfinding information (2005). Chebat et al. also suggest that “hedonist” (pleasure) shoppers enjoy browsing more than “utilitarian” (problem-solving) shoppers and that a mall’s legibility (how well a place can be “read” so things can be found in it) has more bearing on utilitarians than hedonists. Moreover, the authors reveal that a retail consultant confessed he advises “managers . . . not to make the products too easy to find because the typical shoppers of these stores (usually called ‘cherry-pickers’) had an intrinsic pleasure finding them” (Chebat et al., 2005). The expression “cherry-pickers” brings to mind Marcia Bates’s “berrypicking” technique, used to describe the search process as nonlinear and evolving. Lueg and Bidwell employ the term “berrypicking” to depict wayfinding behavior in unfamiliar territory (2005). These connections are worth plumbing for what they may suggest toward an improved understanding of wayfinding in LIS.

The final body of non-LIS research on wayfinding examined here comes from the field of HCI and thus addresses the phenomenon largely in virtual spaces. This small corpus of selected texts was consulted mainly because not much about wayfinding on the Web can be found in any of the cognate literatures. Rather, Web-based wayfinding seems to be approached from different

angles, such as browsing or searching, which fall in the province of Web navigation, and the research done in this area borders on exhaustive. Another reason why the literature on wayfinding in VEs was investigated is that even when there is an article or two about wayfinding on the Web, it is missing the empirical and/or scholarly perspective to back it up—which HCI articles on wayfinding have in spades.⁷ Almost without exception, each of the HCI articles perused for this review invokes, whether to a modest or large degree, the literature on cognitive mapping and spatial problem-solving (Darken & Sibert 1996; Chen & Stanney, 1999; Vinson, 1999; Bidwell, Lueg & Axup, 2005). This base approach means that, not surprisingly, real-world wayfinding serves as a model for virtual wayfinding. Of all the types of literature reviewed for wayfinding, however, the HCI readings were the hardest to absorb; once the cognitive and spatial connections are made between real-world and virtual wayfinding, the articles inevitably move into more technical, theoretical content (mathematical notations are not uncommon), which is challenging for non-computer-science readers to follow.

In essence, this short literature review casts into relief where some of the gaps in wayfinding research are: the paucity of connections being made between wayfinding and some tested terms or ideas in LIS, such as information overload and problem-solving (certainly the call to further connections already made between berrypicking and wayfinding has been made); the need to define wayfinding itself more clearly and operationally in order for it to be researched more effectively; a closer examination of disorientation (one might link it to Carol Kuhlthau's concept of uncertainty in the information seeking process, which Kuhlthau has defended as a potentially positive, rather than negative, experience); and the work that needs to be done in assessing carefully the HCI literature on wayfinding, pulling it together perhaps to mine what it might suggest about wayfinding on the Web.

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⁷ One way to respond to this virtual void would be to wade through the research done on interface design, perhaps, or information architecture, which I hope to do for an extended version of this paper.

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