User wayfinding strategies in public library facilities

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A B S T R A C T

An experiment in a public library demonstrates that Passini's conceptual framework of wayfinding can be applied to public library patron wayfinding behavior. Participants were asked to think aloud while completing prescribed wayfinding tasks. Findings indicate that library patrons use all five of Passini's strategies to varying degrees, supporting the need for further research testing this framework with library patrons. Participants were given varying level of details on Passini's strategies prior to completing the wayfinding tasks, and that intervention had no significant effect on the results.

1. Introduction

On the whole, wayfinding research in LIS has been largely practical and not based on theories of wayfinding behavior. A study guided by Passini's conceptual framework of wayfinding (Mandel, 2013) was inconclusive due to methodological limitations. Passini's framework (1981) includes five strategies of wayfinding: 1) dividing the task into manageable parts while keeping an eye on the larger task at hand, 2) narrowing, 3) adapting and responding, 4) accessing one's schemata, and 5) gathering information and adapting accordingly. Strategy 1 is a structured process that operates at different levels of generality, through which the wayfinder focuses on individual tasks or subtasks always while considering the problem as a whole. Strategy 2 is how the wayfinder deals with one problem or subtask at a time. In using strategy 3, the wayfinder follows a continuous process of adapting and responding to environmental cues in order to deal with unforeseen problems whenever they occur. With strategy 4, the wayfinder relies on an existing solution repertoire for as large a part of the decision plan as possible. Using strategy 5, the wayfinder bases his plan on gathering and responding to available environmental information.

While some observed behaviors from the previous study (Mandel, 2013) fit into the framework of these five strategies, others did not. Additionally, interviewees were unable to articulate use of two of Passini's five wayfinding strategies when asked to recall their prior wayfinding experiences. Ascertaining people's thought processes through research is a challenge. A researcher has to either assume that visible behaviors indicate cognitive processes or ask people to verbalize those cognitive processes. When asked to verbalize thoughts, people often struggle to recall and clearly articulate how they were thinking

during prior experiences. A method for addressing this challenge in wayfinding research has been the use of experiments where participants are given wayfinding tasks to complete and asked to think aloud while completing those tasks. This method allows people to articulate their thoughts as they occur, rather than having to recall them at a later date, and it minimizes the need for researchers to assume behaviors indicate thought processes. While used often in research set at hospitals and airports, the think aloud protocol is only now gaining use as a research method for investigations of library wayfinding behavior.

2. Problem statement

Libraries can be large, complicated structures with multiple levels, annexes, and hidden corners, among other wayfinding challenges. These types of buildings can be difficult to navigate on their own. When library patrons are wayfinding, they may also have anxiety and information needs adding to their cognitive load, making wayfinding extremely difficult. The goal of wayfinding research in general is to ease orientation and navigation for humans wayfinding in a space. For libraries, this has led the majority of library wayfinding research to be guided by practical need to design libraries and signage systems that support user navigation through physical space, but in one specific library at a time. Very little research has been done that is based in theory or that aims to develop a working theory of library user wayfinding, thus limiting the generalizability of that research. A prior study began the process of testing applicability of a wayfinding theory to library patron wayfinding by investigating whether library patrons were making any use of Passini's wayfinding strategies (Mandel, 2013), but the study was inconclusive due to the use of unobtrusive observation

and interviews, neither of which were able to capture patron's thoughts during wayfinding activities. Empirical research on wayfinding in libraries that is grounded in theory offers the chance to generalize findings beyond one library and its users to instead describe how users orient and navigate in libraries in general. This can help us meet users' needs with regard to where they need wayfinding information, what types of wayfinding information they need in which places, and where they are being overwhelmed with too much information, impeding their wayfinding ability.

This study contributes to the growth of theory-based wayfinding research in libraries by conducting an experiment using the think aloud protocol. The goal is to elucidate use of Passini's wayfinding strategies among public library users in order to determine if the strategies are used and if so, which ones are used and to what degree. The larger goal is to use these findings to develop guidelines for improving the level of wayfinding ease in libraries based on users' wayfinding behavior and spatial information needs. For example, if there are tasks for which users are not using signs to help them or areas of the library in which users know where to go based on architectural cues, then it's possible there are extraneous signs in the library that could be removed to lighten the cognitive load on users. This will users more likely to find what they are looking for in libraries, thereby increasing their satisfaction with the experience and likelihood they will continue to use libraries.

This research investigates three research questions:

RQ1. If users are given a wayfinding task to complete in a facility and asked to think aloud while completing the task, which (if any) of Passini's strategies do they use to complete the task?

RQ2. To what degree does the type of task affect which of the strategies wayfinders use?

RQ3. If the strategies are explained to wayfinders, to what degree a) do they understand what the styles and strategies mean and b) realize whether or not not they are using the strategies while they wayfind?

3. Literature review

3.1. Theoretical underpinnings of library wayfinding research

A genesis of wayfinding research can be traced to *The Image of the City* (Lynch, 1960) and its appraisal of the external built environments intrinsic to cities. Lynch perceives the relationship between the city and any person (the user) in that environment as subject to a variety of "legibility." As wayfinding research turned to internal built environments (see Best's, 1970 exploration of wayfinding in a constructed facility, the Town Hall in Manchester, UK), the research naturally became prescriptive.

Understanding how individuals navigate built environments can inform architects, designers, and stakeholders about how to design facilities. Wayfinding research has found application for the design of large multi-use public buildings and systems such as housing complexes (Gärling, Lindberg, & Mantyla, 1983) and museums (Cosley et al., 2009). Libraries, mostly public and academic, have also considered the need for and result from wayfinding research. This has contributed to the conversation, with an emphasis on library signage systems (Bosman & Rusinek, 1997; Brown, 2002; Byam, 1979; Daniels & Eakin, 1979; Loomis & Parsons, 1979; Pollet & Haskell, 1979; Schoonover & Kinsley, 2014; Stempler & Polger, 2013).

Greater ease for users demands a more intuitive experience, one that frees them from dependence on even well placed signs. Research informed by Passini's conceptual framework of wayfinding (1981), the development of that framework, and its application in thoughtful, creative, and informed experiments has the potential to change facility design such that "users do not have to concentrate on navigation, but can orient and navigate intuitively while satisfying their needs"

(Mandel, 2018, p. 3). The wayfinding described in Passini's, 1981 conceptual framework has theoretical linkage to information seeking theory (Kuhlthau, 1993; Kuhlthau, Heinström, & Todd, 2008); and it assumes an intended destination. Passini describes wayfinding in a built environment to include three synchronous processes: the user processing information with reference to previous and held knowledge/experience, making decisions and plans based on that knowledge, and transforming plans into actions. The conceptualized framework (Arthur & Passini, 1992) is understood and used as a wayfinding information system—specifically as it facilitates success navigating to a desired location or piece of information. It is yet to be determined with any certainty whether the methodology can apply when a destination is not intended.

Discoverability in the physical and digital worlds is central to librarianship. With a focus on digital, as opposed to physical, wayfinding, Morville's *Ambient Findability* (2005) describes an iterative, step-by-step process through which people navigate individually. Given that each step is contingent upon previous decisions, the more precise an understanding of the thinking at each of those pressure points, the more informed and robust the data. There is a strong connection between Morville's emphasis on the iterative nature of searching and the value of think aloud protocol in research that examines how people find things.

Baskaya, Wilson, and Özcan (2004) emphasize familiarity with the setting to explore ease and unease with navigation of built environments, as do Gärling et al. (1983). Bosman and Rusinek (1997), Li and Klippel (2012), and Corlett, Manenica, and Bishop (1972) investigate and describe the effectiveness of signage as an aid to navigation with implicit and explicit recommendations. Others look more broadly at facility and service systems (Dempsey, 2006; Evans, Fellows, Zorn, & Doty, 1980; Hahn & Zitron, 2011; Hassanain & Mudhei, 2006; Palmer, 2008).

So, the exploration and research around wayfinding in libraries includes the influences of and on spatial design, the impact of signage, and other built directives. However, if the goals are to combat lostness (Best, 1970) and "improve the overall findability of library information and resources," (Mandel, 2018, p. 2) the research needs to describe the user experience as authentically as possible.

3.2. Wayfinding research using the think aloud protocol

One way to achieve an unfiltered account of the user experience is to employ think aloud protocol for collecting data. In this protocol, research participants are usually given a task to complete, then asked to articulate "what they saw, thought and did" while completing the task (Chebat, Gélinas-Chebat, & Therrien, 2005, p. 1594). They are often audio-recorded, with their thoughts later transcribed for analysis.

Facilitators in Baker, Bakkalbasi, Call, and Kamsler's (2015) study prompted participants to "narrate their actions completely" (p. 2). Hahn and Morales (2011) employed a similar think aloud protocol and identified six thematic areas from participants' spoken thoughts. Discerning the "personal and affective" (p. 420) allowed researchers to know, assess, and evaluate a user's confidence as well as their level of discouragement. That kind of information supports the creation of design that is responsive to user feedback, understands the origins of the feedback, and incorporates user consultation in the creation of services. Kato and Takeuchi (2003) also advocate for the enriching role of taxonomies created from collected verbal data and the details proffered by think aloud transcripts.

Kinsley, Schoonover, and Spitler (2016) use Go/Pro cameras and think aloud protocol in conjunction with survey and mapping to help pinpoint wayfinding trouble spots in an academic library. Consciously building on the work of Larsen and Tatarka (2008) and Hahn and Zitron (2011), Kinsley et al. (2016) describe a cost effective, multi-method approach to identify specific decision and failure points in library wayfinding.

Larsen and Tatarka (2008) ask participants to think aloud in a study