IJSW

INTERDISCIPLINARY JOURNAL OF SIGNAGE AND WAYFINDING

ii

The Interdisciplinary Journal of Signage and Wayfinding is the official publication of the Academic Advisory Council for Signage Research and Education (AACSRE). AACSRE's membership is comprised of faculty at institutions of higher education throughout the United States representing the wide variety of academic disciplines concerned with signage and wayfinding research. AACSRE seeks to provide a forum for academic literature of an interdisciplinary nature that may not meet the disciplinary strictures of other academic journals, so current signage and wayfinding research can be made accessible to academics and practitioners alike. The IJSW is a peer-reviewed, interdisciplinary journal that disseminates current and ongoing research in the fields of signage and wayfinding. Works published in IJSW further current knowledge and practice across disciplines concerned about the influences of signage and wayfinding on viewer behavior, and impacts on and perceptions of the built environment. The IJSW is committed to the sharing and dissemination of signage and wayfinding research, such that all issues are available digitally without charge at https://journals. shareok.org/ijsw.

The Interdisciplinary Journal of Signage and Wayfinding (ISSN 2470-9670) is published biannually in the Spring and Fall. The IJSW has been published digitally since 2016 by the University of Oklahoma Libraries, and is indexed by ROAD, MIRABEL, DOAJ, and CROSSREF.

table of contents

Ghirardelli Square

EAT & DRINK

SHOP & PLAY

CAMPFIRE CIRCLE

San Francisco Maritime
National Historical Park

Lincoln Blvd at Graham St

lyft

WARDEN'S HOUSE

Welcome

1 Human Phenomena
2 Tinkering
3 Seeing & Listening
4 Living Systems
5 Outdoor Exhibits
6 Observing Landscapes

Seaglass Restaurant

THANK YOU MEMBERS
for supporting the Exploratorium!

Use your discounts today:

Seaglass Restaurant
10% OFF

Store
Seismic Joint Cafe
10% OFF

WELCOME TO FRANCISCO PARK

ALCATRAZ
NATIONAL PARKS

1 Main Prison / Cellhouse
2 Wharf
3 Building 64
4 Guardhouse / Sallyport
5 Electric Shop
6 North Road
7 Officers' Row
8 West Road
9 Eagle Plaza
10 Agave Trail

Allen's Hummingbird
Arrival: winter
Departure: late summer
Southern Mexico 2000 miles

Snowy Plover
Arrival: fall
Departure: spring
Morro Bay 200 miles

Monarch Butterfly
Arrival: winter
Departure: early spring
Pacific Northwest 800 miles

Ruby-crowned Kinglet
Arrival: fall
Departure: spring
Pacific Northwest 1000 miles

EXIT

ALOE

Editor's Introduction

Pat Crawford

Director
School of Design
South Dakota State University

pat.crawford@sdstate.edu

Robert Dalton

Assistant Professor
School of Design
South Dakota State University

Marisa Ten Brink

Assistant Professor
School of Design
South Dakota State University

The summer 2024 issue of the Interdisciplinary Journal of Signage and Wayfinding highlights the importance of engaging end users, including the general public as stakeholders, in the design and regulatory policy development of signage. Signs and symbols play multiple roles in the development of signage and wayfinding systems. As sign designers, makers and regulators, we have an obligation to consider how signs and symbols reflect the character of a neighborhood or district, support brand identity and marketing for businesses, function as wayfinding for users, and support place making overall. Evidence based design is an approach used in many disciplines, including the built environment professions, to support decision making with findings derived from quantitative and qualitative research techniques. The articles in this issue use theory generation with perspectives from multiple disciplines, case studies with think-aloud user techniques and shadow methods, and an exhibition evaluation of the development of the language of symbols internationally.

The issue begins with "A Stakeholder Approach to the Regulation of On-Premise Signs" by the interdisciplinary team of Christopher Auffrey, Mathew Isaac, Steven Kopp, Hannah Marriot, Aparna Sundar, Charles Taylor and Franklin Velasco Vizcaino. The authors bring diverse perspectives to creating a theoretical model to expand the scope and depth of relevant stakeholder groups into policy and regulatory decision making. Stakeholder theory expands the concept of stakeholders to include sign companies, suppliers, businesses, regulators, consumers and members of the public at large. The authors recognize points of tension that can arise between goals such as economic prosperity, preserving cultural identity and the impacts of technology on sign fabrication for on-premise signage. The article is divided into sections representing perspectives such as differentiation of a business and shared community identity and national laws and local regulations. Their analysis highlights the need for a move away from policy and decision making based on anecdotal information towards use of academic and consumer research to critically navigate the interests of different stakeholder groups within unique contexts. The ultimate goal of using a stakeholder

3

model is to enhance placemaking, community well-being and advancing the growth of a "symbol-based" economy.

The next two articles provide research-based evidence to enhance our understanding of wayfinding. "The Role of Maps and Signage in Interior Wayfinding: An Exploratory Qualitative Study," by Saman Jamshidi and Debajyoti Pati, uses participant observation and a think-aloud protocol. This exploratory work fills a gap in the literature which has extensive use of confirmatory approaches. The focus of the confirmatory approach is on finding the target with manipulation of attributes or environmental elements. The exploratory approach focuses on the wayfinding behaviors and thought processes while finding the target. The main research questions are 1) How do users use maps and signage in real-world interior wayfinding? and 2) What attributes of maps and signage can facilitate or impede interior wayfinding? The study group included 11 participants with wayfinding tasks in two complex university buildings. The findings suggest that maps are not a primary strategy for wayfinding thought processes and may actually create more confusion when maps are oriented differently within the building. The authors suggest further exploration of digital 3-D maps and use of room numbering, rather than names, that relate to zones such as floor level and corridor adjacency to enhance wayfinding in unfamiliar interior environments.

"The Journey to the Grave: Evaluating a Swiss Cemetery Wayfinding System Using Shadowing Techniques," by Harald Klingemann, Jimmy Schmid, Andrea Umbricht, Daniela Rota, and Nicole Hametner brings another research based persepective to understanding how end users perceive wayfinding systems. The authors use observation methods to explore the effectiveness of a pilot wayfinding system implemented in the city of Zurich's Sihlfeld cemetery. The research question focuses on navigation of funeral goers to the internment site with the goal of increasing on-time arrival. The use of an unobtrusive shadowing technique allowed the researchers to observe behaviors directly in the cemetery and identify critical points where mourners deviated from the predetermined ideal path. Over eight observation days, 49 people were shadowed as they navigated to 17 burial ceremonies. Up to 27% of the mourners arrived late to the burial site and deviated from the ideal path. Anaylis reveals a multi-facted

communication system is essential for achieving the goal of on-time arrival. Elements include enhanced prior communications directing mourners to the best entrance and to important sigage that will be provided on site the day of the burial, site signage that supports orientation for augmenting wayfinding with digital maps or calling other people, and scheduling to avoid two burials in the same area of the cemetery. The authors emphaise that signage and wayfinding requires an interdisciplinary approach to support end users, especially in times of stress.

The issue concludes with an exhibition review by Craig Berger, "Give Me a Sign: The Language of Symbols at the Cooper Hewitt Museum in New York." The museum curators use Henry Dreyfuss's 1972 book, *Symbol Sourcebook: An Authoritative Guide to International Graphic Symbols*, as the launch point for their interactive exhibit. Dreyfuss's text is the first complication of symbols and semiotics bringing together examples from around the world. The exhibit includes interpretive materials around the development symbols for the Olympics, political movements, the accessibility symbol, and emoji development and adoption. The study of symbols has an important role to play in developing public signage and wayfinding, especially for regulatory buy-in for public transportation, healthcare, vehicular signage systems.

We hope you enjoy these articles and consider adding to the conversation with your own research work to expand our understanding of signage and wayfinding.

A Stakeholder Approach to the Regulation of On-Premise Signs

Christopher Auffrey*

Professor of Planning
School of Planning, College of Design,
Architecture, Art, and Planning
University of Cincinnati

*Corresponding Author
chris.auffrey@uc.edu

Mathew S. Isaac

Thomas F. Gleed Chair of Business Administration
Professor of Marketing
Albers School of Business
Seattle University

Steven W. Kopp

Associate Professor of Marketing
Walton College of Business
University of Arkansas

Hannah Marriott

Lecturer in Marketing and Strategy
Cardiff Business School
Cardiff University

Aparna Sundar

Researcher
University of Washington

Charles R. Taylor

John A. Murphy Professor of Marketing
Villanova School of Business
Villanova University

Franklin Velasco Vizcaino

Vice Dean of the College of Business Administration
Universidad San Francisco de Quito

INTRODUCTION

Inhabitants of developed economies, whether urban or rural, live among and often rely on signs, and as such, signs are an important part of their built environment. In the United States, there are currently about 6,000 sign manufacturing companies with a combined annual revenue of approximately $13 billion (Dun & Bradstreet, 2024). These manufacturers create many of the physical outdoor signs that businesses erect to communicate with existing and prospective customers who are outside their establishment (e.g., passerbys on the street).

Outdoor signs are often classified as "on-premise" versus "off-premise"—these two categories have distinctive functions and often entail different regulatory jurisdictions. Formally, on-premise signs are defined as those "erected, maintained or used in the outdoor environment for the purpose of the display of messages appurtenant to the use of, products sold on, or the sale or lease of, the property on which it is displayed" (Bertucci & Crawford, 2016, p. 21). More succinctly, on-premise signage is at the location of the business, whereas off-premise signs (e.g., most billboards and outdoor advertising) are located apart from the business location (e.g., on the highway roadside).

The present research focuses exclusively on on-premise outdoor signage, which represents one of the historically oldest and most important forms of retail communication. Archaeological evidence of storefront signs has been

Abstract

Using stakeholder theory, this article introduces a framework to inform decision making with respect to the regulation of on-premise signs. Because signage resides in a broader, shared environment and its regulation largely takes place at the local level of government, it can be considered unique among most other marketing-related communications. On-premise signs are important to individual businesses and the communities in which they are used, but at the same time, they are "out in the world," cannot be avoided, and may not be relevant to or welcomed by many consumers who are exposed to them. A transformative consumer research lens is applied in this article to arrive at regulatory recommendations that balance the interests of the business with the interests of consumers, the general public, and other stakeholders.

Keywords:

on-premise signage, stakeholder theory, transformative consumer research, regulation

5

identified in China dating back as far as 27 BCE (Eckhardt & Bengtsson, 2010; Moore & Reid, 2008) and in the volcanic remains of Pompeii from 29 BCE (Larwood & Hotten, 1866; Presbrey, 2000). Throughout the history of on-premise signage, the composition and placement of signage has shifted with developments in architecture, technology, and artistic abilities (Treu, 2012). Signs that once adhered to exterior walls were shifted away from the physical building to accommodate distinctive architectural facades. Wood, stone, metal, and, increasingly, various types of plastic have all served as signage materials. Early illumination for commercial signs was provided by gas flames and then later by electricity-powered incandescent, neon gas tubes, fluorescent lights, and more recently by LEDs. Animations have included mechanical motors that caused lights to flash or appear to move, digitally-driven lettering, and most recently the equivalent of high-definition video displays. Indeed, all of these technologies altered the landscape of entire cities, and with each of these innovations came resistance from various constituencies (Treu, 2012).

Different communities may apply broader or narrower restrictions in their local sign codes, including distinguishing between commercial and non-commercial use of the premises or excluding signs located within a retail structure unless they are visible through a window. Comprehensive conceptualizations of on-premise retail signage might also include distinctive architectural features such as facades or awnings. Nevertheless, it is generally agreed that on-premise signs are a form of place-based communication that may include graphic devices and systems. Retail business owners depend on this visual medium to drive awareness and interest in their offerings.

Despite the prevalence of on-premise signage, relatively few academic articles have explored issues related to the regulation of signs from the vantage point of the consumer and/or the business (cf. Bloch & Kamran-Disfani, 2018; Taylor & Sarkees, 2016). Instead, most discussion of signage regulation takes place among legal scholars in reference to competing legal jurisdictions and statutory interpretations (Chang & Killion, 2015; Connolly, 2012; Jourdan et al., 2013; Morris et al., 2001). The focus of prior research has been on resolving regulatory disputes through various perspectives of law (property rights, commercial speech) and urban planning (traffic safety, wayfinding, economic

development, fiscal impact, sense of place). Against this backdrop, we offer a perspective on signage regulation that recognizes that although on-premise signs can identify authentic sources of products and contribute to community engagement, they may simultaneously compromise aesthetic, historical, and environmental qualities of life (Connolly, 2012; Miller, 2009).

The purpose of this article is to develop a conceptual model that identifies ways in which relational engagement and effective signage regulation can incorporate the goals of different stakeholders. Our efforts are grounded in *transformative* consumer research (TCR), a philosophy that encourages cross-disciplinary approaches to complex decisions with the aim of improving consumer environments and lifestyles (Ozanne et al., 2014). The resulting framework, which balances the interests of business and the general public, can be used in evaluating the regulation of on-premise signs. Because signage resides in a broader, shared physical environment, it differs from many other types of marketing communications. On-premise signs are important to individual businesses and their communities, but unlike many other marketing media, they are "out in the world," cannot be avoided, and may not be relevant to many of the consumers exposed to them. As will be discussed in this article, on-premise signage requires coexistence among local businesses and the consumers those businesses serve, yet decisions with respect to constraints and allowances for signs are typically made without scientific evidence.

Our conceptual model allows us to identify critical points of tension among stakeholders, where the presence of signage and its regulation can create disputes within communities. We then identify the contexts contributing to these points of tension and use them to articulate areas in need of additional research and structure in policy making. In the final section of the paper, we offer specific public policy recommendations for communities that are based on academic research. In this way, the paper makes a theoretical advance in the understanding of signage regulations and contributes to both managerial and public policy decision making.

The article is organized as follows. The opening section introduces a novel stakeholder model of on-premise signage regulation. It also provides foundational information
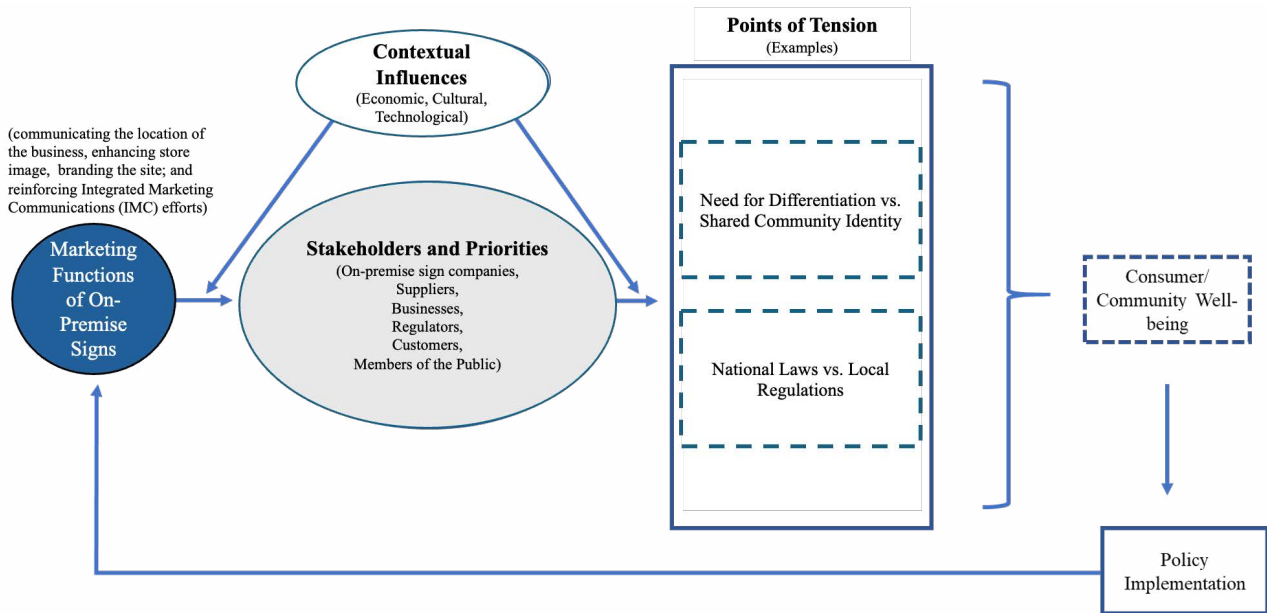
Figure 1 /

Conceptual stakeholder model of on-premise signage regulation.

on the role that on-premise signage plays from a marketing and consumer standpoint, as well as its societal impact. We then elaborate on the way this form of marketing communication is currently regulated. After that, we explain how stakeholder theory informs our model and provides a structure to organize the complex issues involved. Through the lens of our model, we discuss the effects of regulations on signage and the tensions created among the various constituencies, and we conclude by outlining implications and directions for future research.

ON-PREMISE SIGNAGE AND ITS REGULATION

Overview of the Model

Figure 1 depicts our model of on-premise signage regulation. The model's primary focus is on how competing stakeholder priorities create points of tension among various stakeholders in the regulatory process, the resolution of which has a direct effect on policy implementation and consumer and community well-being. An important aspect of the model shown on its left-hand side is the acknowledgement that signage performs key marketing functions for businesses of all types (e.g., national, local)

and all sizes (Taylor et al., 2012). In addition, economics, local cultural standards, and technology all influence and impact stakeholder priorities. Effective resolution of points of tension that may emerge is essential to effectively balance stakeholder priorities, which, in turn, leads to community wellbeing. In the following sections, we describe each aspect of the model in detail.

Functions of On-Premise Signage

At a fundamental level, signs are important navigational tools that offer information aimed at orienting individuals in a physical space or in a built environment (Jourdan, 2019). On-premise signs perform several important marketing functions for the businesses that use them (Taylor et al., 2005), including: (1) communicating the location of the business; (2) enhancing store image; (3) branding the site; and (4) reinforcing Integrated Marketing Communications (IMC) efforts. We elaborate on these functions since they collectively play a key role in the success or failure of a business (Taylor et al., 2012).

Communicating the Location of the Business

For many businesses, the most basic function of an on-premise sign is to communicate the location of the

business to customers (Auffrey & Hildebrandt, 2017; Calori & Vanden-Eynden, 2015). For signage to play its role effectively, it must be visible to the consumer and conspicuous within the environment in which it exists (Bullough, 2017). An on-premise sign is often the only way for consumers to learn where a business is located (Taylor & Sarkees, 2016). High visibility is important to communicate not only where the store is to consumers (Berman et al., 2018) but also to induce impulse stops from consumers passing directly by the business (Taylor et al., 2012). Thus, on-premise signs can help bring in new customers and encourage existing customers to make a return visit.

Branding the Site

Beyond simply establishing a locational cue for consumers, signs offer a means by which to differentiate a retailer's brand from others. Research has provided considerable evidence that consumers respond to identifying colors (Bellizzi & Hite, 1992; Meyers-Levy & Peracchio, 1995), shapes (Veryzer & Hutchinson, 1998), typefaces, and background design elements (Mandel & Johnson, 2002; Rahman & Mehta, 2020) that can be part of the signage and physical appearance of a retail store. The interaction of exterior visual features can affect perceptions and positioning, effectively branding the site.

For example, gasoline is sold to retail customers at filling station locations, often those of a major oil company, a national superstore chain, or a national convenience store chain, most of which display brand logos on pole signs and pumps. The visual appearance of the sign links the brand to the business's physical site. The expectation of a positive customer experience, lower price, or other attributes become affixed to that location. When the exterior appearance and signage for the business are distinctive and memorable, this site branding can help increase desire for a product, decrease price sensitivity, and enhance memory, awareness, loyalty, and brand equity (De Nisco & Warnaby, 2013; Keller, 2013; Taylor et al., 2005).

An important aspect of this function is that the on-premise sign can brand a site even when businesses are closed. A sign illuminated after hours helps create top-of-mind awareness, so even though the consumer may not need or even be able to access the product or service at that moment, they will be more likely to recall the location at a subsequent time when they do. Thus, on-premise signage that helps to shape the business' image can include all characteristic features of the signage and interior and exterior features of the building, identifying one business and differentiating it from others (Kopp & Langenderfer, 2014).

Enhancing the Image of the Store or Business

Marketing scholars have long agreed that brick-and-mortar retailers must create and reinforce a store image to ensure success (Bloch & Kamran-Disfani, 2018; Golden et al., 1987; James et al., 1976). Storefronts and signage play an important role in not only attracting attention but also communicating the store's image and atmosphere to consumers (Berman et al., 2018). For example, some stores communicate a prestigious image via the use of expensive signage in conjunction with an elegant storefront.

Reinforcing Integrated Marketing Communications (IMC) Efforts

Because of the important role it serves, on-premise signage should be considered an essential component of a comprehensive marketing strategy that views marketing communications holistically (Kitchen et al., 2004; Muñoz-Leiva et al., 2015). The concept of integrated

marketing communications (IMC) suggests that every point of contact a company has with the consumer influences perceptions of the brand. Value judgments are forged from the cumulative bundle of messages that consumers have received over time and the various touchpoints they have with the business (Belch & Belch, 2018). Thus, the consumer's impression of a company is influenced by exposure to advertising, the store environment, the price of the product, and other marketing variables (Taylor et al., 2005). A sign that displays a logo or brief message can reinforce other communications and branding efforts of the marketer, offering the potential to increase traffic to the business and increase sales.

Collectively, all retailers in a community who are competing for visual attention may create a community environment that seems dynamic and easy to maneuver, or alternatively, unappealing, tacky, and cluttered, depending on the beholder and the specific mix of signage. The flexibility or stringency of regulation by local governments may strongly influence the use and effectiveness of these marketing functions, but other contextual factors may affect stakeholder priorities or be a product of those priorities.

Contextual Factors That Affect Stakeholder Priorities

Perhaps no area of land use law is more difficult than sign regulation (Weinstein, 2002). On-premise signs occupy outdoor private spaces and are intentionally visible to those in nearby public spaces. While it is generally accepted that regulations are appropriate and necessary if they limit the placement and size of signs to maintain visibility for traffic safety, those regulations may reduce the functionality and diminish the value of the sign. On the other hand, when communities seek to limit signage design, placement, and size for purely aesthetic reasons, the issue of regulating on-premise signs can benefit from considering the stakeholders involved. Because the laws, codes, covenants, or other parameters used to regulate signs are developed and applied at a local level, sign regulations may be among the most democratic in terms of allowing resident input and reflecting local values and opinions. One important aspect of this stakeholder orientation is that it is inclusive of stakeholder groups but that the context of a particular issue or phenomenon may affect the prioritization of stakeholders (Ferrell et al., 2010). For example, in the context of on-premise signage, the cumulative social value of signage that is consistent with a "historic district" may outweigh the economic value of a sign intended to stand out from others (Smith, 1983).

Contextual factors both influence and are influenced by stakeholder priorities as part of the regulatory and managerial decision-making process, yet sign regulations often include minimal justification from behavioral science. Three contextual factors that have a profound influence on signage regulation are the economic environment, cultural factors, and technological factors.

Economic Environment

The use of signage is primarily designed to provide economic benefits to its owner. However, communities benefit from the products, services, jobs, and tax revenues local retail businesses provide. On-premise signs provide information leading to better-informed choices about goods and services resulting in additional economic benefits for consumers (City of Gresham, Oregon, 2002). Taxes paid by local retailers and their employees help reduce or stabilize the taxes on residents; these subsidize essential public services such as police

9

and fire/EMS, public schools, streets, and roads (City of Gresham, Oregon, 2002). Regulations may diminish the ability of a business to attract customers and thereby reduce its economic contribution to the community.

Retailers recognize the importance of on-premise signs for financial viability and economic sustainability (Rexhausen et al., 2012; Ellis et al., 1997). A national survey of retail businesses found that well-designed and located signs are cost-effective components of marketing and branding strategies and are especially important for small businesses (Rexhausen et al., 2012). Similarly, the use of additional and improved signage was associated with increased revenues and profits for those businesses (Rexhausen et al., 2012). Further, considerable anecdotal evidence as well as briefs from court cases (Taylor et al., 2005) suggest that the (regulatory) removal of signs damages the retailer. Theory (Rexhausen et al., 2012) also offers that contextually inappropriate signs or poorly designed or located signs can also have a negative collective economic impact on businesses and contribute to the decline of the business districts and the communities where they are located. Signage can negatively affect viewers' aesthetic perceptions of urban streetscapes, which can reduce evaluations of the community's character and sense of place (Crawford et al., 2015).

Cultural Factors

Cultural factors are frequently related to community size and composition and may explain why some areas have more extensive signage regulations than others. Some wealthier "bedroom communities" may have significant constituencies who actively favor strict regulation on size and uniformity of signs to maintain the residential ambiance of the community. Larger cities, with a broader range of land use and greater dependence on business tax revenues, may have significantly less participation in public hearings that determine sign codes. By contrast, in small rural communities, individuals may know the business owners and choose to minimize sign regulation to help the local economy. Thus, local "signage culture" and attitudes toward signage, its function, and its visual appeal can vary widely.

Discussion of "culture" in a policy context recognizes there is rarely a single culture or "public interest" representing the values, beliefs, and norms of all stakeholders. This is certainly the case with signage regulations that may reflect a vision of an official, narrowly-defined public interest, based on political processes with varying degrees of participation and consensus. Ultimately, approaches to sign regulation reflect the interests and relative influence among those with access to policymaking processes. In this regard, it is worth noting that the regulation of signs within the multicultural milieu of larger cities faces the additional challenge of accounting for a broader diversity of attitudes, perceptions, and expectations that coexist in closer proximity to one another (Barabantseva et al., 2019).

Because the businesses that use on-premise signs exist as part of a community, the issue of public opinion and attitudes toward signs is relevant. Analyses of a national sample (Kellaris, 2011, 2012, 2013) revealed that consumers believe that on-premise signs play multiple roles in helping businesses. According to the study, consumers believe that signage: (1) draws traffic to businesses; (2) helps consumers infer the quality and/or character of a business; (3) provides information about new products; and (4) is important for helping to find businesses. A substantial and increasing majority of study participants reported they had failed to find a business because the signage was too small or unclear.

Technological Factors

The technology of signage has quickly advanced, leading to innovations that have included improved energy efficiency and enhanced legibility without outward projection of light. Additionally, the ability to display changing digital messages has revolutionized the amount and type of messaging on signs. As technology has changed, so have attitudes toward signage, garnering both new supporters and opponents.

These underlying contextual issues help determine the priorities of stakeholders. In the next section, we introduce stakeholder theory and identify the key stakeholders in on-premise signage regulation. Using this theory, we explain how our model helps us understand the points of tension arising from the diverse set of stakeholders and make better decisions about the regulation of on-premise signage.

STAKEHOLDER THEORY AND STAKEHOLDER ORIENTATION

Stakeholder theory was developed as a counterargument to the assertion that an organization should be managed solely for the purpose of maximizing the wealth of the organization's owners (Freeman, 1984). "Stakeholders" were initially defined as "[a]ny group or individual who can affect or is affected by the achievement of the firm's objectives" (Freeman, 1984, p. 25). The theory aims to account for all constituencies significantly affected by a business's practices, including shareholders, customers, employees, local communities, and suppliers, but also for those who have an influence on those business decisions. It posits that companies should not focus primarily on economic benefit to owners, but rather on creation of value for the broader set of stakeholders (Greenley et al., 2005; Hult et al., 2011). Stakeholder theory explicitly addresses ethical and moral issues that exist in operating a business and places significant emphasis on corporate social responsibility in market economies and in the social contract (Bazin & Ballet, 2004), such that individuals or groups with a legal, economic, moral, or self-perceived opportunity to claim ownership, rights, or interests in a business are considered stakeholders. This approach has proven empirically useful across a wide range of applications (Du et al., 2016; Elijido-Ten et al., 2010; Wang & Sengupta, 2016).

Stakeholders in the On-Premise Signage Regulation Implementation

The stakeholder approach views the business as a set of interrelated, explicit, or implicit connections between individuals and/or groups of individuals (Rowley, 1997) and focuses on the interests of all groups affected by a business' actions (Ferrell et al., 2010; Freeman, 1984). Within the decision making for policy regarding on-premise signs, we regard an entity as a stakeholder if one of the following three characteristics is present: (1) The entity has the potential to be affected (positively or negatively) by on-premise sign regulation and/or is concerned about the regulation's impact on their well-being; (2) The entity can withdraw or grant resources needed for on-premise sign regulation activities; or (3) The entity is valued by the organizational culture of those affected by on-premise sign regulation (Ferrell et al., 2010, p. 94).

In response to several calls for a robust application of the stakeholder approach across research disciplines (Hult et al., 2011; Hult & Tomas, 2011; Freeman et al., 2010), we apply and amend these criteria to identify the following on-premise signage regulation stakeholders:

1. On-premise sign companies and their employees (companies that make and sell on-premise signs to end users)
2. Suppliers (manufacturers of equipment and materials used in the manufacturing process of making the sign, e.g., poles, lighting, vinyl, electronics)
3. Businesses (end-users of on-premise signs, including manufacturers, retailers, and service businesses who purchase on-premise signs to fulfill the marketing functions identified earlier)
4. Regulators (normally includes city or municipality council and other local government officials charged with planning and code enforcement, but these are overseen by state and federal constitutions)
5. Customers (the general public from inside and outside a community who patronize the local businesses)
6. Members of the public, in their broad capacity of citizens of a community (includes those concerned about the environmental impact of signage)

Because on-premise signage regulations apply the same standards to all businesses within a specified area, the stakeholder approach can be applied to an entire geographic area rather than just to a single business entity. A robust application of the theory also includes "non-human" stakeholders ("the natural environment"), although these interests may be represented by people (Driscoll & Starik, 2004; Laine, 2010; Menguc & Ozanne, 2005). Policy and regulatory activities and decisions face the challenge of constantly balancing the claims of one stakeholder against the claims of others; this requires some assessment of the validity of the various claims but also the ultimate goal of consumer and community well-being. As with any societal decision, different entities try to accomplish multiple and often incongruent objectives; yet, there are few objective assessments or comprehensive scientific studies to support policy-making decisions in this domain.

POINTS OF TENSION IN ON-PREMISE SIGNAGE REGULATION

Commercial language and communication in the inhabited landscape compete for space and conspicuity like any other urban material or ideological manifestations, such that signage used for business vies with political and traffic signage for visual and psychological attention. Because signage regulatory decisions are very local, they become "strategic tools that are wielded in local politics, power struggles, and competing claims to space" (Leeman & Modan, 2009, p. 332). When making decisions related to the use and regulation of on-premise signage, the interactions of subjective interpretations of elements within the built physical environment can exacerbate tensions among stakeholders as each group responds through adaptation, design, and stringency (Orlando, 2013).

It is surprising that on-premise signage regulation, which is a socially pervasive and managerially significant issue, has not attracted more "consumer-related" research. In any evaluation or prescription concerning on-premise signage and its regulation, it is relevant to include marketing analysis or consumer-related analysis along with business, law, and urban planning perspectives. Despite the acknowledged value of communication between businesses and customers, points of tension still exist between retail businesses and the communities in which they are embedded.

We refer again to our model to provide examples of these tensions and identify areas of research that can inform decisions about on-premise sign regulation. We focus here on two examples of areas where tension may arise: Need for Differentiation vs. Shared Community Identity, and National Laws vs. Local Regulations. In each area, the flexibility of signage regulation can significantly affect the stakeholders involved and alter the desired outcomes of consumer and community welfare. Notably, these are just two examples of the types of regulatory tensions on which our model can help shed light.

Need for Differentiation vs. Shared Community Identity

As discussed earlier, retailers generally aspire to create a unique and differentiated store experience from their competitors—distinctive on-premise signs help businesses to identify themselves and attract customers, allow local residents to easily locate and purchase desired goods and services, and provide important jobs and tax revenue (City of Gresham, Oregon, 2002; Taylor et al., 2005). However, this need for differentiation at the level of the business often conflicts with the desire that community members have to create a shared identity for the community as a whole.

Building a shared community identity necessarily involves issues of aesthetics, community character, and placemaking, which can have implications for the regulation of on-premise signs (Nasar, 1990). In the realm of sign regulation, aesthetics refers to how signs are visually experienced and appreciated within their environmental context by individual viewers and will vary based on personal tastes, cultural preferences, socioeconomic background, and education (Hein et al., 2010). Signage can negatively affect viewers' aesthetic perceptions of urban streetscapes, which can negatively influence viewers' perceptions of the community's character and sense of place (Crawford et al., 2015).

Community character refers to the distinct identity of a place, reflecting those features of a community that make it "unique, memorable, livable and inviting" (Kendig, 2010), and is thus the application of the collective aesthetic appreciation to a broader community geography. Sign codes that compel visual uniformity in a zoned district may not incorporate consideration of how to promote sign visibility and conspicuity with the differentiation needs of a specific business. This is important because some will choose where to live and spend leisure time based on their perceptions of community character (Morley, 2018).

Placemaking is the process by which the community character or distinctive identity of a place is created. The visible elements that define a place are important foci of the placemaking process (Calori & Vanden-Eynden, 2015). The regulation of on-premise signs is considered by some to be essential to placemaking in order to provide the requisite "unique identity and sense of place" (Calori & Vanden-Eynden, 2015). Another aggregate effect of signage is thus to visually demarcate communities and certain areas of cities. If this demarcation is intentional, then individual sign owners may be required to operate within the bounds of specific, locally focused regulations (City of Germantown, 2019); if demarcation is unintentional, it may suggest discrimination (Lewis, 2010).

Empirical examinations of people's aesthetic perceptions and responses to places have only focused incidentally on on-premise signage and have instead centered on variations in other architectural and design elements (Wolf, 2005). Yet other work has explicitly omitted signage from experimental manipulations (Pall & Hartig, 2013). Results suggest that people

trade off preferences among certain criteria (Crawford et al., 2015; Weber et al., 2008), as well as differences between what laypersons and architects prefer (Gjerde, 2011). From a retailer standpoint, there is a need to assess consumers' perceptions of signage along with those of all other stakeholders. Most stakeholders are likely to agree that concepts of "beauty" and "unsightliness" exist in the abstract, but different segments of a community may have very different predilections. When each individual sign owner uses color, illumination, location, and size to achieve conspicuity, these factors may stir a variety of community aesthetic preferences (Portella, 2016).

Therefore, it can be difficult to implement regulatory controls that balance the reasonable use of an individual's property, communication rights, technology, historical preservation, and administrative consistency. The culture of a community, including its values, beliefs, and norms and their resulting attitudes, perceptions, and expectations, will affect the nature of the use and regulation of on-premise signs (Houck, 1969). In some communities, the predominant social and political values and beliefs restrict sign regulation to only the most essential traffic safety issues, whereas other communities strictly limit private business activity and readily constrain sign usage based on much broader interpretations of traffic safety issues and aesthetic criteria (Morris v. City of New Orleans, 2019; Orlando, 2013).

National Laws vs. Local Regulations

As discussed earlier, local signage regulations are rooted in local norms. However, locally determined restrictions can sometimes be at odds with protections invoked by national laws. This is especially the case when considering branding.

Branding is one of the most impactful functions of on-premise signage. The conceptualization of "brand" that continues to evolve in consumer and marketing research (Ailawadi & Keller, 2004; Diamond et al., 2009; Levy, 2017) extends to on-premise signs and retail architecture. All of the constructs that may be applied to brands—personality (Aaker, 1997), icon status (Holt, 2004), basis for reference groups (Escalas & Bettman, 2005), extensions of self (Belk, 1988), symbolism of cultural groups (Torelli et al., 2017), and nostalgia (Schindler & Holbrook, 2003)—are connected to these symbolic expressions when they are features that can be accentuated by retailers.

One overarching component of a branding strategy is the consistent use of the brand across any appearance across media, including signage (Berthon et al., 2007). This is true for single stores or those that have more than one location. This consistency is beneficial both to the sign owner and to consumers (Kopp & Langenderfer, 2014). Retailers can use signage to convey information about brand or product line extensions, ranging from broader umbrella brands to niche or boutique brands. For example, a traveler on a U.S. interstate highway may see signs at a distance for Doubletree, Hampton, and Homewood Suite hotels, all belonging to the Hilton Worldwide Holdings, while visitors to larger cities may see building-affixed signs at sidewalk level for Waldorf or Conrad hotels, also owned by Hilton. Each of these service offerings provides a different customer experience: The brand positioning and differentiation from competitors are facilitated by the signage and its placement.

A second overarching component of any branding strategy includes legal protection (Kopp & Langenderfer, 2014; Patel & Pearce, 2018). As the legal manifestation of branding, trademark protects the use of on-premise retail signage through the Lanham Act (15 U.S.C. §§

1051; Century 21 v. Nevada Real Estate Commission, 1978). For signage, this simply means that a competitor may not use logos or other visual material that may confuse potential customers. Signage is further federally protected as a type of speech by the First Amendment of the U.S. Constitution (Menthe, 2009; Reed v. Town of Gilbert, 2015). Protectable matter includes the "total image and overall appearance" of a product or establishment, encompassing "size, shape, color or color combinations, texture, [or] graphics" of a product or establishment (Two Pesos v. Taco Cabana, 1992). The interpretations of trademark law have broadened what is considered protectable content to include a constellation of sensory components that lead to awareness, recognition, satisfaction, and loyalty. This has enabled sign owners to add intangible value to retail branding efforts by protecting the kind of image and other associations displayed on the sign.

However, local uniform aesthetic and historic regulations may prescribe the content of commercial or other signage. For example, a city government may be motivated to restrict the use of signage that uses nationally protected brand features as a way to protect local businesses from competitive encroachment. Content-based restrictions on signs are unconstitutional unless the local government can prove that the restriction is narrowly tailored to further a compelling government interest, such as safety or aesthetic concerns intended to maintain or enhance community character (Duerksen & Goebel, 1999). As a somewhat puzzling consequence, a local government cannot compel the trademark/brand owner to alter its appearance to comply with zoning parameters (Blockbuster v. Tempe, 1998) but can ban the use of a trademark altogether (Lisa's Party City v. Henrietta, 1999), so long as the code is uniformly applied. In this fashion, local codes and covenants that limit the use of signs may (however unintentionally) dilute the capacity of the sign/brand owner to maintain strategy-driven consistency and federal trademark protection.

Empirical evidence suggests that physical signage very much serves the purposes of branding and authenticating the retailer (Rosenbaum et al., 2016). Research supports the inference that on-premise signage and other exterior environmental cues exert cognitive and affective influences on retail consumers' shopping behavior (Bloch & Kamran-Disfani, 2018; Turley & Milliman, 2000; Velasco, 2018). The ambient, design, and social factors that compose a retail environment, and a broader shopping environment, include signage (Dennis et al., 2014), exterior appearance (Lange et al., 2016), architecture (Van Oel & den Berkhof, 2013), and accessories (Rosenbaum et al., 2018).

Cumulatively, the above sources of tension manifest in an outcome of "public interest," which results in the lenience or flexibility of on-premise signage regulations; these regulations, in turn, directly affect the manager's decision as to how the signs may be used: in other words, the marketing functions. The tensions here arise because what a local business owner may construe as an effective marketing and branding tool may be considered an eyesore to residents living nearby. For those concerned about creating and preserving the visual character of a community as part of an overall approach for creating places where those with a choice want to live, on-premise signs, like other aspects of land use, may be candidates for regulation. From an urban planning perspective, the appropriateness of sign regulation depends on the environmental context (natural, built, social) in which the signs are located and their potential impacts on elements of the community (MCPC, 2014). As such, the desire

to avoid these negative contextual impacts constitutes a valid basis for regulating the use of on-premise signs (Duerksen & Goebel, 1999; Jourdan et al., 2013).

IMPLICATIONS FOR ON-PREMISE SIGNAGE REGULATION

As signage regulation has too often been based on anecdotal evidence and has not made sufficient use of scientific-based evidence (Jourdan et al., 2013), a key implication of our analysis is that academic research, including consumer research, should be considered carefully when balancing the interests of stakeholders. When points of tension exist, it is important to examine factual data to determine the best course of action. As will be discussed below, consumer surveys and studies of business impact can sometimes provide factual background that help navigate trade-offs. For example, when considering the environmental costs of signage (e.g., uses recyclable materials, illumination), studies of the actual impact of current practices and consumer perceptions, along with dissemination of knowledge on the impact of new technologies, can contribute to more transparent and informed decisions.

Our perspective is that the social and economic culture of a community, along with attitudes toward the use of new technologies will affect the nature of the use and regulation of on-premise signs, reflecting how those signs affect many aspects of a community. Signs provide a mechanism for communicating with the public, contributing to the viability of local businesses, and, perhaps most importantly, acting as a means of free speech and personal expression. In addition, signs may become formal or informal community landmarks that serve as wayfinding references as well as identifying business locations and branding those businesses. This extends the concept of "signage" beyond the marketing functions.

Signage may serve as one of the physical cultural characteristics that contribute to place-making (Stage, 2011, 2013). A community's unique physical attributes, such as natural features or intact historic buildings, may be used to support arguments for strict sign regulations (Rotenberg, 2015; Shipley & Snyder, 2013). For some places, preserving aesthetic character associated with these attributes may be an essential goal for social, environmental, and economic reasons. At the same time, some local industries, such as tourism (Taylor & Taylor, 1994) and transportation (Edquist et al., 2011) may be more dependent on signage than others. In either case, the study of public opinion in affected areas is valuable.

Signs also may collectively contribute, positively or negatively, to residents' and visitors' perceptions of a community's character and sense of place (MCPC, 2014; Sundar et al., 2018). So, while there is widespread agreement about the importance of on-premise signage, there are also widely experienced points of tension among those stakeholders engaged with on-premise signs and the representative local governments who would regulate them. These tensions arise from the desire of a community to create or preserve a visual environment that characterizes the values and tastes of its citizens while addressing the requirements of businesses to identify themselves, attract customers, allow access for local residents to locate and purchase desired goods and services, and provide important tax revenue (City of Gresham, Oregon, 2002). Until recently, regulations for signage were based on the geographic location of the business owner. As cultural and technological shifts have changed how communities view themselves, the bases for regulation have become more complex. Again, public opinion surveys of the community itself should be considered.

Current regulatory standards tend to consider signs as message-delivery systems and focus on the economic and individual effects of controls on the size, shape, color, height, placement, orientation, location, and illumination of signs (Duerksen & Goebel, 1999). This philosophy may contribute to the visual uniformity of a zoned district but does not incorporate consideration of how to promote sign visibility and conspicuity, and the differentiation needs of each business.

The stakeholder model serves effectively in this application, as it helps to organize these complexities. The model identifies those factors affecting and affected by policy decisions but also exposes the tensions among those stakeholders that are consequences of flexible or stringent regulations. None of the tensions are simple or uncontroversial. Take the example of signage illumination. Technology that allows for a longer-lasting, energy-efficient illuminated sign may conflict with a community's desire for a different appearance or ambiance. A regulatory restriction on a nationally branded restaurant chain may influence the corporate decision to locate a franchisee somewhere else, which would affect the local economy. A retailing business seeking LEED certification may have to seek out a compliant manufacturer, who in turn would require sources for appropriate materials. Clearly, studies on the environmental impact of various technologies can help manage the trade-off between maximizing the marketing impact of on-premise signs for companies and the sign's environmental impact.

A primary challenge to any business is to respond to shifting societal norms and preferences. In the realm of local sign regulation, there are several opportunities for public policy to support transformative change that improves consumer welfare through effective communication and marketing strategies. This may be especially the case with respect to the achievement of broader societal goals resulting from the positive changes in consumer environments and lifestyles toward which transformative consumer research is aimed. The achievement of these broader societal goals involves balancing the direct interests of individual consumers and businesses.

Over the past decade, several articles published in law journals have focused on the development of sign regulations, suggesting best practices for achieving a balance of these interests (Jourdan et al., 2013; Jourdan et al., 2017; MCPC, 2014; Weinstein, 2017). All of the suggested best practices acknowledge the importance of on-premise signage for businesses and the communities they serve but also note that local governments can (and perhaps are obligated to) regulate signs to protect the health, safety, and welfare of their residents. The regulation of aesthetics also falls under these protections, seeking to prevent visual blight, clutter, or incongruities that would detract from "a healthy commercial economy" (Jourdan et al., 2013, p. 1). Aesthetics also relate to the protection of an area's "community character," which influences commercial and residential property values and is influential in determining where some people shop and seek entertainment as well as where they will live.

Consistent with the thinking of Jourdan et al. (2013), "evidenced-based sign regulation" that draws on research can be viewed as a best-practice approach for determining the need for sign regulation. This, along with a stakeholder approach, can help identify opportunities in which consumer research can inform regulatory decision making. Transformative consumer research would suggest focusing on outcomes that benefit all stakeholders. Regulation that is structured appropriately using the framework of stakeholder theory may incentivize businesses to create new sign designs that are at least equally effective in communicating,

marketing, and branding, while addressing aesthetic or environmental concerns, in effect creating a win-win situation that benefits the community and the business.

Additionally, there may be valuable learnings that can be gleaned from studying the regulation of one of the most restrictive on-premise signage environments—the U.S. shopping mall. The owners of these malls impose size and lighting standards for signs intended to create and maintain an ambiance considered attractive for the intended customer base. Presumably, those retailers who agree to these restrictions believe that the advantages of conformity outweigh the disadvantages. In fact, foot traffic at many shopping malls (and other brick-and-mortar stores) have rebounded following the COVID-19 pandemic (WSJ, 2024).While the approaches used to govern signage in a shopping mall may not always translate directly to Main Street or even a suburban strip mall, the use of a stakeholder theory approach can help identify similar tensions that might exist and yield creative new approaches.

CONCLUSIONS

The preceding discussion makes clear that there is need for a broadened understanding of the roles that signage plays in individual use and collective impact, and the implications of that understanding for on-premise signage regulation. Retailers' success often has less to do with quality and price, and more with style and identity-making. As with products and services, consumers appropriate certain retail brands and use their purchases as a means of social distinction and belonging (Zukin & Maguire, 2004). Thus, retail signage, architecture, and design have become more integrated, elaborate, and complex activities, focusing on branding, place-making, and the creation of shopping-friendly atmospheres (Klingmann, 2007; Lonsway, 2013). This symbol-enhanced economy produces constant negotiations for designed and built environments where signs, buildings, streets, and green space all effectively contribute to the nature of a community through exclusion or inclusion of stakeholder groups in public and private spaces. Using a transformative consumer research lens, this research concludes that the roles, responsibilities, and rights of each of these stakeholders need to be jointly acknowledged and understood. Ultimately, this can inform the necessary decision making with respect to the regulation of on-premise signs that balance the interests of business with those of consumers, members of the general public, and other stakeholders.

REFERENCES

Aaker, J. L. (1997). Dimension of brand personality. *Journal of Marketing Research, 34*(3), 347–356.

Ailawadi, K. L., & Keller, K. L. (2004). Understanding retail branding: Conceptual insights and research priorities. *Journal of Retailing, 8*(4), 331–342. DOI: http://dx.doi.org/10.1016/j.jretai.2004.10.008

Auffrey, C., & Hildebrandt, H. (2017). Do motorists see business signs? Maybe. Maybe not. A study of the probability that motorists view on-premise signs. *Interdisciplinary Journal of Signage and Wayfinding, 1*(2), 100–115. DOI: http://dx.doi.org/10.15763/ijsw.v1i2.8

Barabantseva, E., Mhurchú, A. N., & Peterson, V. S. (2019). Introduction: Engaging geopolitics through the lens of the intimate. *Geopolitics*, July 3, 1–14.

Bazin, D., & Ballet, J. (2004). Corporate social responsibility: The natural environment as a stakeholder?" *International Journal of Sustainable Development, 7*(1), 59–75. DOI: http://dx.doi.org/10.1504/ijsd.2004.004981

Belch, G. E., & Belch, M. A. (2018). *Advertising and promotion: An integrated marketing communications perspective*. McGraw Hill. DOI: http://dx.doi.org/10.5937/ekonhor1403265r

Belk, R. W. (1988). Possessions and the extended self. *Journal of Consumer Research, 15*(2), 139–168. DOI: http://dx.doi.org/10.1086/209154

Bellizzi, J. A., & Hite, R. E. (1992). Environmental color, consumer feelings, and purchase likelihood," *Psychology & Marketing, 9*(5), 347–363. DOI: http://dx.doi.org/10.1002/mar.4220090502

Berman, B. R., Evans, J. R., & Chaterjee, P. R. (2018). *Retail management*. Pearson.

Berthon, P., Holbrook, M. B., Hulbert, J. M., & Pitt, L. (2007). Viewing brands in multiple dimensions. *MIT Sloan Management Review, 48*(2), 37–43.

Bertucci, A. D., & Crawford, R. B. (2016). *Model code for regulation of on-premise signs*. United States Sign Council Foundation.

Bloch, P. H., & Kamran-Disfani, O. (2018). A framework for studying the impact of outdoor atmospherics in retailing. *AMS Review, 8*(3/4), 195–213. DOI: http://dx.doi.org/10.1007/s13162-018-0111-5

Business Roundtable. (2019). *Statement on the purpose of a corporation*.

Bullough, J. (2017). Factors affecting sign visibility, conspicuity, and legibility: Review and annotated bibliography. *Interdisciplinary Journal of Signage and Wayfinding, 1*(2), 2–25. DOI: http://dx.doi.org/10.15763/ijsw.v1i2.9

Calori, C., & Vanden-Eynden, D. (2015). *Signage and wayfinding design: A complete guide to creating environmental graphic design systems*. John Wiley and Sons. DOI: http://dx.doi.org/10.1002/9781119174615

Century 21 Real Estate Corp. v. Nevada Real Estate Advisory Commission, 448 F. Supp. 1237 (1978).

Chang, C., & Killion, P. J. (2015). Sign languages: The regulatory authority of municipalities over commercial signage does not trump the First Amendment. *Los Angeles Lawyer, 37*, 28–35.

City of Germantown, Tennessee. (2019) Code of Ordinances, Sec. 14-37, Old Germantown (OG) District. (Code 1986, § 17-32; Ord. No. 2011-05, 7-25-11; Ord. No. 2011-08, 10-10-11).

City of Gresham, Oregon. (2002). *Strategic Plan* (May).

Connolly, B. J. (2012). Environmental aesthetics and free speech: Toward a consistent content neutrality standard for outdoor sign regulation. *Michigan Journal of Environmental & Administrative Law, 2*(1), 185–224. DOI: http://dx.doi.org/10.36640/mjeal.2.1.environmental

Crawford, P., Lee, E., & Beatty, M. (2015). Aesthetic perception of urban streetscapes and the impact of form-based codes and traditional zoning codes on commercial signage. *Current Urban Studies, 3*(3), 199–215. DOI: http://dx.doi.org/10.4236/cus.2015.33017

De Nisco, A., & Warnaby, G. (2013). Shopping in downtown: The effect of urban environment on service quality perceptions and behavioral intensions. *International Journal of Retail & Distribution Management, 41*(9), 654–670. DOI: http://dx.doi.org/10.1108/ijrdm-05-2013-0106

Dennis, C., Brakus, J. J., Gupta, S., & Alamanos, E. (2014). The effect of digital signage on shoppers' behavior: The role of evoked experiences. *Journal of Business Research, 67*(11), 2250–2257. DOI: http://dx.doi.org/10.1016/j.jbusres.2014.06.013

Diamond, N., Sherry, J. F., Jr., Muniz, A. M., Jr., McGrath, M. A., Kozinets, R. V., & Borghini, S. (2009). American Girl and the brand gestalt: Closing the loop on sociocultural branding research. *Journal of Marketing, 73*(3), 118–134. DOI: http://dx.doi.org/10.1509/jmkg.73.3.118

Driscoll, C., & Starik, M. (2004). The primordial stakeholder: Advancing the conceptual consideration of stakeholder status for the natural environment. *Journal of Business Ethics, 49*(1), 55–73. DOI: http://dx.doi.org/10.1023/b:busi.0000013852.62017.0e

Du, S., Yalcinkaya, G., & Bstieler, L. (2016). Sustainability, social media driven open innovation, and new product development performance. *Journal of Product Innovation Management, 33*, 55–71. DOI: http://dx.doi.org/10.1111/jpim.12334

Duerksen, C. J., & Goebel, M. R. (1999). *Aesthetics, community character, and the law*. PAS Report, 489–490.

Dun & Bradstreet. (2024). *First research industry profile: Sign manufacturing*.

19

Eckhardt, G. M., & Bengtsson, A. (2010). A brief history of branding in China. *Journal of Macromarketing, 30*(3), 210–221. DOI: http://dx.doi.org/10.1177/0276146709352219

Edquist, J., Horberry, T., Hosking, S., & Johnston, I. (2011). Effects of advertising billboards during simulated driving. *Applied Ergonomics, 42*(4), 619–626. DOI: http://dx.doi.org/10.1016/j.apergo.2010.08.013

Elijido-Ten, E., Kloot, L., & Clarkson, P. (2010). Extending the application of stakeholder influence strategies to environmental disclosures: An exploratory study from a developing country. *Accounting, Auditing & Accountability Journal, 23*(8), 1032–1059. DOI: http://dx.doi.org/10.1108/09513571011092547

Ellis, S. R., Johnson, R., & Murphy, R. (1997). *The economic value of on-premise signage*, International Sign Association.

Escalas, J. E., & Bettman, J. R. (2005). Self-construal, reference groups, and brand meaning. *Journal of Consumer Research, 32*(3), 378–389. DOI: http://dx.doi.org/10.1086/497549

Ferrell, O. C., Tracy, L., Gonzalez-Padron, G., Hult, T. M., & Maignan, I. (2010). From market orientation to stakeholder orientation. *Journal of Public Policy & Marketing, 29*(1), 93–96. DOI: http://dx.doi.org/10.1509/jppm.29.1.93

Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman.

Freeman, R. E., Harrison, J. S., Wicks, A. C., Parmar, B., & de Colle, S. (2010). *Stakeholder theory: The state of the art*. Cambridge University Press. DOI: http://dx.doi.org/10.3917/mana.143.0210

Gjerde, M. (2011). Visual evaluation of urban streetscapes: How do public preferences reconcile with those held by experts? *Urban Design International, 16*(3), 153–161. DOI: http://dx.doi.org/10.1057/udi.2011.10

Golden, L. L., Albaum, G., & Zimmer, M. (1987). The numerical comparative scale: An economical format for retail image measurement. *Journal of Retailing, 63*(4), 393–410.

Greenley, G. E., Hooley, G. J., & Rudd, J. M. (2005). Market orientation in a multiple stakeholder orientation context: Implications for marketing capabilities and assets. *Journal of Business Research, 58*(11), 1483–1494. DOI: http://dx.doi.org/10.1016/j.jbusres.2004.07.004

Hein, C., Ngalamulume, K., & Robinson, K. J. (2010). Urban Planning and Aesthetics. *Urban Health: Global Perspectives, 18*, 339–354.

Holt, D. B. (2004). *How brands become icons: The principles of cultural branding*. Harvard Business School Press.

Houck, J. W. (1969). *Outdoor advertising: History and regulation*. University of Notre Dame, 11–56.

Hult, G., & Tomas, M. (2011). Market-focused sustainability: Market orientation plus! *Journal of the Acadamy of Marketing Science, 39*(1), 1–6. DOI: http://dx.doi.org/10.1007/s11747-010-0223-4

Hult, G., Tomas, M., Mena, J. A., Ferrell, O. C., & Ferrell, L. (2011). Stakeholder marketing: A definition and conceptual framework. *AMS Review, 1*(1), 44–65. DOI: http://dx.doi.org/10.1007/s13162-011-0002-5

James, D. L., Durand, R. M., & Dreves, R. A. (1976). Use of a multi-attribute attitude model in a store image study. *Journal of Retailing, 52*(2), 23–32.

Jourdan, D. (2019). Full issue. *Interdisciplinary Journal of Signage and Wayfinding, 3*(1), 1–2. DOI: http://dx.doi.org/10.15763/issn.2470-9670.2019.v1.i2.a41

Jourdan, D., Hurd, K., & Hawkins, H. G. (2013). Evidence-based sign regulation: Regulating signage on the basis of empirical wisdom. *The Urban Lawyer, 45*(2) 327–348.

Jourdan, D., Strauss, E., & Hunter, M. (2017). Sign code development process: Best practices. *Interdisciplinary Journal of Signage and Wayfinding, 2*(1), 34–59. DOI: http://dx.doi.org/10.15763/issn.2470-9670.2017.v2.i1.a21

Kellaris, J. J. (2011). 100,000 shoppers can't be wrong: Signage communication evidence from the BrandSpark International Grocery Shopper Survey. *The Science of Signage: Proceedings of the National Signage Research and Education Conference*, Signage Foundation, Cincinnati, October 12–13, 2011. DOI: http://dx.doi.org/10.15763/issn.2470-9670.2016.v1.i1.a4

Kellaris, J. J. (2012). Further evidence from the BrandSpark / Better Homes and Gardens American Shopper StudyTM: A longitudinal update and extension. *The Technology of Signage: Proceedings of the National Signage Research and Education Conference*, Signage Foundation, Cincinnati, October 10–12, 2012.

Kellaris, J. J. (2013). Additional insights from the BrandSpark / Better Homes and Gardens American Shopper StudyTM: A three-year longitudinal update. In *Signage as Advertising: Proceedings of the National Signage Research and Education Conference*, October 9–10, 2013, Cincinnati. Signage Foundation.

Keller, K. L. (2013). *Strategic brand management: Building, measuring, and managing brand equity*. Prentice-Hall.

Kendig, L. (2010). *Community character: Principles for design and planning*. Island Press.

Kitchen, P. J., Brignell, J., Tao, L., & Jones, G. S. (2004). The emergence of IMC: A theoretical perspective. *Journal of Advertising Research, 44*(1), 19–30. DOI: http://dx.doi.org/10.1017/s0021849904040048

Klingmann, A. (2007). *Brandscapes: Architecture in the experience economy*. MIT Press.

Kopp, S. W., & Langenderfer, J. (2014). Protecting appearance and atmospherics: Trade dress as a component of retail strategy. *Journal of Public Policy & Marketing, 33*(1), 34–48. DOI: http://dx.doi.org/10.1509/jppm.09.031

Laine, M. (2010). The nature of nature as a stakeholder. *Journal of Business Ethics, 96*(1), 73–78. http://doi.org/10.1007/s10551-011-0936-4

Lange, F., Rosengren, S., & Blom, A. (2016). Store-window creativity's impact on shopper behavior. *Journal of Business Research, 69*(3), 1014–1021. DOI: http://dx.doi.org/10.1016/j.jbusres.2015.08.013

Larwood, J., & Hotten, J. C. (1866). *The history of signboards: From the earliest times to the present day*. Chatto and Windus. DOI: http://dx.doi.org/10.1093/nq/s3-x.239.78f

Leeman, J., & Modan, G. (2009). Commodified language in Chinatown: A contextualized approach to linguistic landscape. *Journal of Sociolinguistics, 13*(3), 332–362. DOI: http://dx.doi.org/10.1111/j.1467-9841.2009.00409.x

Levy, S. J. (2017). Consuming the idea of the brand. In J. F. Sherry, E. M. Fischer (Eds.), *Contemporary Consumer Culture Theory*. Routledge.

Lewis, K. (2010). Yellowtown: Urban signage, class, and race. *Design and Culture, 2*(2), 183–198. DOI: http://dx.doi.org/10.2752/175470710x12696138525668

Lonsway, B. (2013). *Making leisure work: Architecture and the experience economy*. Routledge.

Mandel, N., & Johnson, E. J. (2002). When web pages influence choice: Effect of visual primes on experts and novices. *Journal of Consumer Research, 29*(2), 235–245. DOI: http://dx.doi.org/10.1086/341573

Menguc, B., & Ozanne, L. K. (2005). Challenges of the 'green imperative': A natural resource-based approach to the environmental orientation–business performance relationship. *Journal of Business Research, 58*(4), 430–438. DOI: http://dx.doi.org/10.1016/j.jbusres.2003.09.002

Menthe, D. C. (2009). Aesthetic regulation and the development of First Amendment jurisprudence. *Boston University Public Interest Law Journal, 19*, 225–260.

Meyers-Levy, J., & Peracchio, L. A. (1995). How the use of color in advertising affects attitudes: The influence of processing motivation and cognitive demands. *Journal of Consumer Research, 22*(2), 121–138. DOI: http://dx.doi.org/10.1086/209440

Miller, S. R. (2009). Historic signs, commercial speech, and the limits of preservation. *Journal of Land Use & Environmental Law, 25*(2), 227.

Montgomery County Planning Commission. (2014). *Montgomery County Planning Commission Model Sign Ordinance: A Comprehensive, Content-Neutral Approach to Local Sign Control*. Pennsylvania: APA-Pennsylvania Chapter. https://planningpa.org/resource-library/montgomery-county-planning-commission-model-sign-ordinance/ DOI: http://dx.doi.org/10.2307/3144368

Moore, K., & Reid, S. (2008). The birth of brand: 4000 years of branding. *Business History, 50*(4), 419–432. DOI: http://dx.doi.org/10.1080/00076790802106299

Morley, D. (2018). Measuring community character. *PAS QuickNotes*, 72. https://www.planning.org/publications/document/9142842/

Morris, M., Hinshaw, M. L., Mace, D., & Weinstein, A. (2001). Context-sensitive signage design. *American Planning Association, Planning Advisory Service*.

Muñoz-Leiva, F., Porcu, L., & Barrio-García, S. D. (2015). Discovering prominent themes in integrated marketing communication research from 1991 to 2012: A co-word analytic approach. *International Journal of Advertising, 34*(4), 678–701. DOI: http://dx.doi.org/10.1080/02650487.2015.1009348

Nasar, J. L. (1990). The evaluative image of the city. *Journal of the American Planning Association, 56*(1), 41–53. DOI: http://dx.doi.org/10.1080/01944369008975742

Orlando, C. C. (2013). Art of signage: The regulation of outdoor murals and the First Amendment. *Cardozo Law Review, 35*(1), 867–896.

Ozanne, J. L., Mick, D. G., Pechmann, C., & Pettigrew, S. (2014). Transformative consumer research. In *Wiley Encyclopedia of Management* (Vol. 9). DOI: http://dx.doi.org/10.1002/9781118785317.weom090270

Pall, L. J., & Hartig, T. (2013). Architectural variation, building height, and the restorative quality of urban residential streetscapes. *Journal of Environmental Psychology, 33*, 26–36. DOI: http://dx.doi.org/10.1016/j.jenvp.2012.09.003

Patel, P. C., & Pearce, J. A., II. (2018). The survival consequences of intellectual property for retail ventures. *Journal of Retailing and Consumer Services, 43*, 77–84. DOI: http://dx.doi.org/10.1016/j.jretconser.2018.03.005

Portella, A. (2016). *Visual pollution: Advertising, signage and environmental quality*. Routledge.

Presbrey, F. (2000). The history and development of advertising. *Advertising & Society Review 1*, 1. https://doi.org/10.1353/asr.2000.0021

Rahman, M. N., & Mehta, V. (2020). Signage form and character: A window to neighborhood visual identity. *Interdisciplinary Journal of Signage and Wayfinding, 4*, 1. DOI: http://dx.doi.org/10.15763/issn.2470-9670.2020.v4.i1.a59

Reed v. Town of Gilbert, 135 S. Ct. 2218 (2015).

Rexhausen, J., Hilderbrandt, H., & Auffrey, C. (2012). *The economic value of on-premise signage*. Signage Foundation.

Rosenbaum, M. S., Cheng, M., & Wong, I. A. (2016). Retail knock-offs: Consumer acceptance and rejection of inauthentic retailers. *Journal of Business Research*, 69(7), 2448-2455. DOI: http://dx.doi.org/10.1016/j.jbusres.2016.01.015

Rosenbaum, M. S., Ramírez, G. C., & Matos, N. (2018). A neuroscientific perspective of consumer responses to retail greenery. *The Service Industries Journal*, 1–12. DOI: http://dx.doi.org/10.1080/02642069.2018.1487406

Rotenberg, R. (2015). Design standards as urban planning: from technical specification to community "look" in northeast Illinois suburbs. *Economic Anthropology*, 2(1), 145-164. DOI: http://dx.doi.org/10.1002/sea2.12022

Rowley, T. J. (1997). Moving beyond dyadic ties: A network theory of stakeholder influences. *Academy of Management Review, 22*(4), 887–910. https://psycnet.apa.org/doi/10.2307/259248 DOI: http://dx.doi.org/10.5465/amr.1997.9711022107

Schindler, R. M., & Holbrook, M. B. (2003). Nostalgia for early experience as a determinant of consumer preferences. *Psychology & Marketing, 20*(4), 275–302. https://psycnet.apa.org/doi/10.1002/mar.10074 DOI: http://dx.doi.org/10.1002/mar.10074

Shipley, R., & Snyder, M. (2013). The role of heritage conservation districts in achieving community economic development goals. *International Journal of Heritage Studies, 19*(3), 304–321. DOI: http://dx.doi.org/10.1080/13527258.2012.660886

Smith, P. B. (1983). Judicial review of historic and landmark preservation ordinances. *Urban Lawyer, 15*(3), 555–576.

Stage, W. (2011). *The painted ad: A postcard book of vintage brick wall signs*. Floppinfish Publishing Company.

Stage, W. (2013). *Fading ads of St. Louis*. The History Press.

Sundar, A., Gonsales, F., & Schafer, G. (2018). Synchronicity in signage promotes a sense of belonging. *Interdisciplinary Journal of Signage and Wayfinding, 2*(2), 30–38. DOI: http://dx.doi.org/10.15763/issn.2470-9670.2018.v2.i2.a34

Taylor, C. R., Claus, S., & Claus, T. (2005). *On-premise signs as storefront marketing devices and systems*. U.S. Small Business Administration.

Taylor, C. R., & Sarkees, M. (2016). Do bans on illuminated on-premise signs matter? Balancing environmental impact with the impact on businesses. *International Journal of Advertising, 35*(1), 61–73. DOI: http://dx.doi.org/10.1080/02650487.2015.1059005

Taylor, C. R., Sarkees, M., & Bang, H.-K. (2012). Understanding the value of on-premise signs as marketing devices to businesses for legal and public policy purposes. *Journal of Public Policy and Marketing, 31*(2), 185–194. DOI: http://dx.doi.org/10.1509/jppm.10.054

Taylor, C. R., & Taylor, J. C. (1994). Regulatory issues in outdoor advertising: A content analysis of billboards. J*ournal of Public Policy & Marketing, 13*(1), 97–107. DOI: http://dx.doi.org/10.1177/074391569401300108

Torelli, C. J., Ahluwalia, R., Cheng, S. Y. Y., Olson, N. J., & Stoner, J. L. (2017). Redefining home: How cultural distinctiveness affects the malleability of in-group boundaries and brand preferences. *Journal of Consumer Research, 44*(1), 44–61. DOI: http://dx.doi.org/10.1093/jcr/ucw072

Treu, M. (2012). *Signs, streets, and storefronts: A history of architecture and graphics along America's commercial corridor*. Johns Hopkins University Press. DOI: http://dx.doi.org/10.1353/tech.2013.0089

Turley, L. W., & Milliman, R. E. (2000). Atmospheric effects on shopping behavior: A review of the experimental evidence. *Journal of Business Research, 49*(2), 193–211. https://psycnet.apa.org/doi/10.1016/S0148-2963(99)00010-7 DOI: http://dx.doi.org/10.1016/s0148-2963(99)00010-7

Two Pesos, Inc. v. Taco Cabana, Inc. (1992) 505 U.S. 763.

United States District Court, Eastern District of Louisiana. (2019, July 9). *Morris v. City of New Orleans*.

Van Oel, C. J., & van den Berkhof, D. (2013). Consumer preferences in the design of airport passenger areas. *Journal of Environmental Psychology, 36*(1), 280–290. DOI: http://dx.doi.org/10.1016/j.jenvp.2013.08.005

Velasco, F. V. (2018). Beyond window signs: Understanding the affect-based effects of window signs on store patronage intentions. *Psychology & Marketing, 35*(7), 542–552. DOI: http://dx.doi.org/10.1002/mar.21105

Veryzer, R. W., & Hutchinson, J. W. (1998). The influence of unity and prototypicality on aesthetic responses to new product designs. *Journal of Consumer Research, 24*, 374–394. DOI: http://dx.doi.org/10.1086/209516

Wall Street Journal. (2024). The pandemic was supposed to push all shopping online. It didn't. Retrieved from https://www.wsj.com/articles/the-pandemic-was-supposed-to-push-all-shopping-online-it-didnt-11650081652

Wang, H.-M. D., & Sengupta, S. (2016). Stakeholder relationships, brand equity, firm performance: A resource-based perspective. *Journal of Business Research, 69*(12), 5561–5568. DOI: http://dx.doi.org/10.1016/j.jbusres.2016.05.009

Weber, R., Schnier, J., & Jacobsen, T. (2008). Aesthetics of streetscapes: Influence of fundamental properties on aesthetic judgments of urban space. *Perceptual and Motor Skills, 106*(1), 128–146. DOI: http://dx.doi.org/10.2466/pms.106.1.128-146

Weinstein, A. (2002). Legal issues in the regulation of on-premise signs. In M. Morris, D. Mace, M. Hinshaw, & A. Weinstein (Eds.), *Context-sensitive signage regulation* (pp. 119–153). American Planning Association Planners Press.

Weinstein, A. (2017). Free speech, sense of place, communication, economic development: Signage in the contemporary city. *Interdisciplinary Journal of Signage and Wayfinding, 2*(1), 60–79. DOI: http://dx.doi.org/10.15763/issn.2470-9670.2017.v2.i1.a17

Wolf, K. (2005). Business district streetscapes, trees, and consumer response. *Journal of Forestry, 103*(8), 396–400. DOI: http://dx.doi.org/10.1093/jof/103.8.396

Zukin, S., & Maguire, J. S. (2004). Consumers and consumption. *Annual Review of Sociology, 30*, 173–197. DOI: http://dx.doi.org/10.1146/annurev.soc.30.012703.110553

The Role of Maps and Signage in Interior Wayfinding: An Exploratory Qualitative Study

Saman Jamshidi*

Assistant Professor
School of Architecture
University of Nevada, Las Vegas

*Corresponding Author
saman.jamshidi@unlv.edu

Debajyoti Pati

Professor
Department of Design
College of Human Sciences
Texas Tech University

INTRODUCTION

Wayfinding is "a goal-directed (Montello & Sas, 2006) spatial problem-solving process (Arthur & Passini, 1992) under uncertainty in which one finds a route to a particular target and recognizes the target when approaching it (Chen et al., 2009); this process depends on "perception, information processing, and decision execution" (Jamshidi & Pati, 2020, p. 2). While performing wayfinding in real-world situations may depend heavily on navigating within the environment, it is critical to differentiate these concepts. A critical part of wayfinding is the problem-solving process in which a user should find a route toward a target. However, a user can navigate in an environment where s/he does not need to perform the problem-solving process because the user already knows how to get to the intended target. Thus, wayfinding is essentially a cognitive process that may rely on other processes, such as navigation, to execute wayfinding decisions or gather more information within an environment.

Wayfinding can be challenging, especially in large, complex buildings such as airports, hospitals, and educational facilities. Two main approaches have been used to help people to deal with the challenges during the wayfinding process: (1) relying on wayshowing systems (e.g., signage and map) and (2) reducing the complexity of the environment (Jamshidi & Hashemi, 2020). The first approach aims to reduce the cognitive load associated with wayfinding by providing information regarding potential destinations within a building from a reliable source. Usually, in large and complex environments, targets are not visible from different locations within a building, which makes the wayfinding process challenging. To address this issue, maps and signage are the two most important elements that have been used to compensate for the lack of visibility of targets. This approach has been widely used in complex and large buildings

Abstract

Finding one's way around complex and large buildings, such as hospitals, airports, and educational facilities, can be challenging. Using maps and signage to address wayfinding issues in such buildings is one of the most common solutions. Despite extensive research on maps and signage, few studies have systematically explored how and when people use maps and signage in real-world situations during interior wayfinding. To address this gap, an exploratory, qualitative approach was adopted. Eleven participants were tasked with finding 12 targets within two university buildings. Participants were asked to voice out their thoughts (think-aloud protocol) while carrying out the tasks. Their think-aloud protocol and behavior were recorded and analyzed. The results revealed that the type of initial information available about the target could influence participants' preferences for maps over signage or vice versa. Maps were not often used as the first strategy during wayfinding. Participants were perplexed when they consulted maps in different corridors because each map rotated differently to align with the adjacent corridor. Design issues regarding maps and signage were identified and discussed.

Keywords

wayfinding, map, signage

and its effectiveness has been extensively examined in the literature (e.g., Hashim et al., 2014; Richardson et al., 1999; Vilar, Rebelo, Noriega, Duarte et al., 2014).

In the second approach, however, the focus is on the global environmental elements (e.g., floor plan configuration, corridors, nodes, etc.) and their attributes (e.g., complexity, connectivity, visibility, brightness, color, etc.) to reduce the complexity of the environment, and hence reduce the cognitive load associated with the problem-solving process of wayfinding (e.g., Haq & Zimring, 2003; Li & Klippel, 2016; Lu & Ye, 2019). This paper expands the examination of the first approach. Accordingly, the purpose of this study is to enhance understanding of the wayfinding process in complex indoor environments. Specifically, it aims to explore the role that maps and signage play in aiding individuals to navigate these spaces.

LITERATURE REVIEW

Current evidence pertaining to maps and signage found in the literature is presented in the following sections. For a comprehensive review of environmental factors' role in wayfinding, see Jamshidi et al. (2020).

MAPS

Hölscher et al. (2009) found that novice wayfinders used maps more often than users familiar with the environment; however, the use of maps did not fill the spatial knowledge gap between them. Multiple studies found that using maps can negatively impact wayfinding performance because using maps is time-consuming (Butler et al., 1993; Hölscher et al., 2009; Wright et al., 1993). The evidence in the literature suggests that using signage can help people find targets faster than using maps (Butler et al., 1993; Chen et al., 2009; Wright et al., 1993). The level of detail provided on maps was also influential on wayfinding performance, such that participants who used a schematic map had better behavioral performances (i.e., shorter completion times and shorter route distances) compared to the ones who used a standard floor plan (Meilinger et al., 2006). Using maps was found to improve some measurements of spatial memory (such as estimating the relative locations of landmarks and the straight-line distance between them) more than navigating the real-world environment (Thorndyke

& Hayes-Roth, 1982). In an experiment, Levine et al. (1984) found it was more challenging for participants to solve wayfinding tasks in a library building when You-Are-Here maps were misaligned with a building (i.e., the map was not oriented to match the viewer's position in relation to the adjacent corridor).

Signs

The literature suggests that signage can help people find targets faster than maps (Butler et al., 1993; Chen et al., 2009; Wright et al., 1993). However, signs cannot compensate for challenges caused by floor plan complexity (O'Neill, 1991b). The type of visual communication used on signs can also impact users' performance, such that graphic signs resulted in faster identification of targets than textual signs (O'Neill, 1991b). Combining icons and words was found to decrease the task completion time even more than signs with only texts or only icons (Cope et al., 1999). A study found that color trails on the floor can enhance multiple aspects of wayfinding performance more than color-coded signage panels; however, the difference was not statistically significant (Vilar, Rebelo, & Noriega, 2014).

People's psychological state appears to influence their preference to use signs or rely on environmental affordances such as brighter and wider corridors (Vilar, Rebelo, Noriega, Duarte et al., 2014). For example, in nonemergency egress, people tended to use brighter and wider corridors in the absence of signage; and they tended to follow signs if signage was available. However, in emergency egress, some people relied on environmental cues (e.g., the width of corridors) rather than signage (Vilar, Rebelo, Noriega, Duarte et al., 2014). Finally, people from different countries may comprehend signs differently. Levels of education and culture were found to contribute to this discrepancy (Hashim et al., 2014; Joy Lo et al., 2016).

RESEARCH OBJECTIVE AND QUESTIONS

Although maps and signage are among the environmental factors that have been extensively studied, most of the studies on wayfinding have used a confirmatory approach (Jamshidi et al., 2020). In the confirmatory approach, some known attributes or environmental elements are manipulated to investigate causation. Although

using a confirmatory approach is important, this approach cannot explore unknown attributes of maps and signage that may influence the wayfinding process. Relying solely on confirmatory methods, while neglecting exploratory strategies, can lead to several limitations. These include hindering a comprehensive understanding of the topic, discouraging theory formulation, obscuring the fundamental processes underlying observed events, and missing out on unexpected discoveries (Jamshidi & Pati, 2024).

Utilizing an exploratory approach can address this gap in the literature. Accordingly, this study addresses the following research questions, in an attempt to identify additional attributes of maps and signs, hitherto unknown, which may aid in wayfinding decision-making:

1. How do users use maps and signage in real-world interior wayfinding?
2. What attributes of maps and signage can facilitate or impede interior wayfinding?

The novelty of this study lies in its implementation of an exploratory qualitative method to address the discussed gap in the literature concerning the role of maps and signage in interior wayfinding. The findings of this study are expected to deepen our theoretical understanding of wayfinding, as well as to aid in the development of design recommendations for creating more effective maps and signage.

METHODS

This study adopted an exploratory, qualitative approach from a post-positivist perspective. The primary data sources were think-aloud protocols and observation of participants. The study was approved by the institutional review board (IRB) of the parent institution of the researchers.

Participants

A convenience sampling strategy, followed by purposive sampling was adopted. Students and staff of the university were invited to participate. The eligibility of interested potential participants was then assessed using the inclusion and exclusion criteria listed below. Participants had to be between the ages of 18 and 50 and capable of performing study tasks independently. This age range was specifically chosen because this study was conducted amidst the COVID-19 pandemic, and the IRB imposed limitations to mitigate the spread of the virus among high-risk populations. The participants had normal or corrected-to-normal vision and no hearing deficits. They had to be unfamiliar with the study setting. Participants were required to be fluent English speakers and not have a background in architecture or allied disciplines (e.g., interior design). All participants received monetary compensation for their participation (US $20).

Study Setting

The study was conducted in two buildings on the campus of a large university in western Texas. Building 1 (B1) consists of two parts: the older part has three levels (including a basement), and the newer part has seven levels (including a basement). The two parts are connected via the first and second floors, not the basements. Several you-are-here (YAH) maps are mounted on the walls of this building. However, they are not present on all levels. YAH maps are aligned with the adjacent corridors, so they match the viewer's position in relation to the corridor. Room numbers begin with the digit indicating the floor level, lacking distinction between building sections (old versus new) in their numbering system.

Building 2 (B2) has three levels, including a basement. The courtyard in the center of B2 is visible from various parts of the building. A collection of floor plans is posted on a board in the building's southwest area, while evacuation plans are mounted on the walls throughout the building. Room numbers begin with a digit indicating the floor on which they are located. See Figure 1 and Figure 2 for floor plans of B1 and B2, respectively.

Data Types and Instruments

This paper focuses on two primary data sources: (1) wayfinding thought processes and (2) wayfinding behaviors. As a spatial cognitive variable, "a wayfinding thought process consists of the mental processes underlying wayfinding as a spatial problem-solving process, which may result in learning new spatial information" (Jamshidi, 2021, p. 28). Participants were prompted to voice out their thoughts while searching for targets (think-aloud protocol) to collect data on the wayfinding process. If participants were silent

for an extended period, the researcher prompted them to think aloud. Participants' voices were recorded using a digital voice recorder (Sony ICD-PX370) and a microphone (Sony ECM-CS3).

A handheld camcorder (GoPro Hero 8) was used to record participants' wayfinding behavior to collect data. Wayfinding behavior is "any sequence of consciously or subconsciously directed life processes that result in changes of location through time" (Golledge & Stimson, 1997, p. 155).

Data Collection and Analysis

Participants were taken to a room in B1, where they were fitted with a microphone and a voice recorder. Next, they were taken to the starting point in one of the two buildings and asked to find the first target within that building. Each participant was instructed to locate a total of six targets within each building (12 targets in total). Table 1 shows the list of targets. As each participant had to independently find their way to the targets, the path taken by each individual was unique. They were instructed to think aloud while performing tasks. The order of visiting buildings was determined based on the participants' availability and the buildings' operation hours.

To enhance the trustworthiness of the collected data, multiple measures were used. First, the think-aloud protocol data were triangulated with the data from observations (video recordings). Second, to address the carryover and tiredness effects, the order of buildings was altered for different participants. Third, participants were asked to explain their decisions in random locations to reduce their sensitivity to the researcher's inquiry about their behaviors throughout the trial. This technique was used to reduce the effect of the data collection process on participants' behavior.

A grounded theory approach was used to analyze the think-aloud protocol and participant behavior data to develop hypotheses about how participants used maps and signage and what attributes of maps and signage facilitated or hindered the wayfinding process. To that end, coding, interpreting, and analyzing collected data was done through a memoing technique. Memoing is a technique to analyze qualitative data and enables the researcher to explore the meanings within the data (Birks et al., 2008). To achieve this objective, the data collected from the think-aloud protocol were transcribed and analyzed to identify thematic codes. Subsequently, memos, which are analytical notes pertaining to these codes, were created. Following this, ideas that best interpreted the data were defined. It is worth noting that although grounded theory is a methodology for constructing theories, it does not necessarily result in the formulation of a specific theory (Charmaz, 2014).

Table 1 / Starting Points and the Sequence of Destinations Used in the Wayfinding Tasks

Building name	Starting point	Sequence of destinations
Building 1 (B1)	Entrance 1H6	Room 211 A-I, Room 306, Room 61, Lecture Hall, Room 244, North-East Entrance
Building 2 (B2)	South-East Entrance	Room 73, Room 104, Dpt. of Political Science – Online and Graduate Center, Room 206, Room 136, South Main Entrance

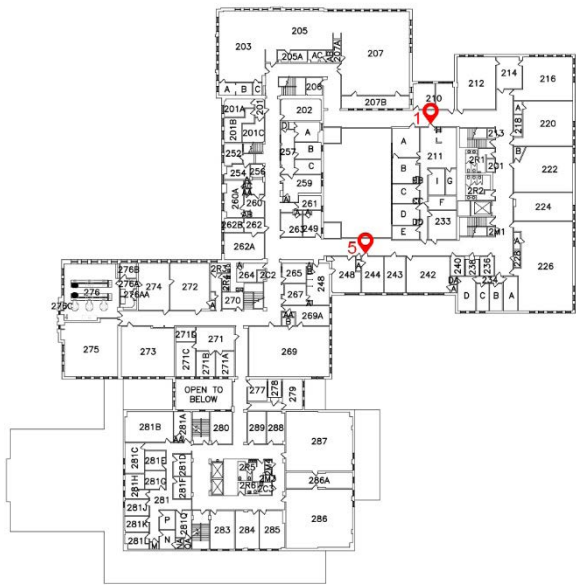*Figure 1 / Floor Plans of Building 1 (B1)*

Note. This building consists of seven levels (including a basement). The floor plans of other levels are not provided because none of the tasks were performed on these levels.
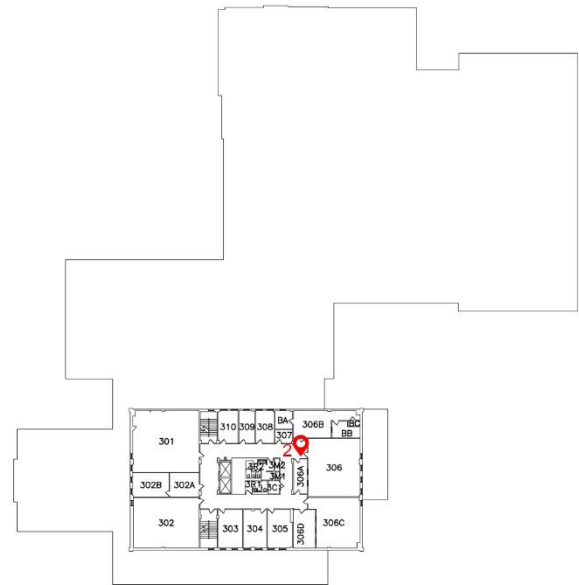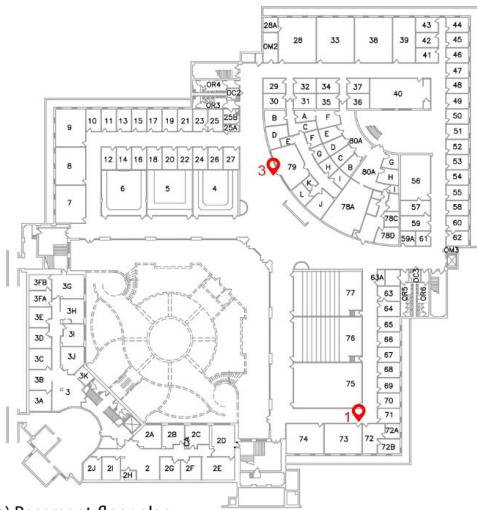

(a) Basement-floor plan
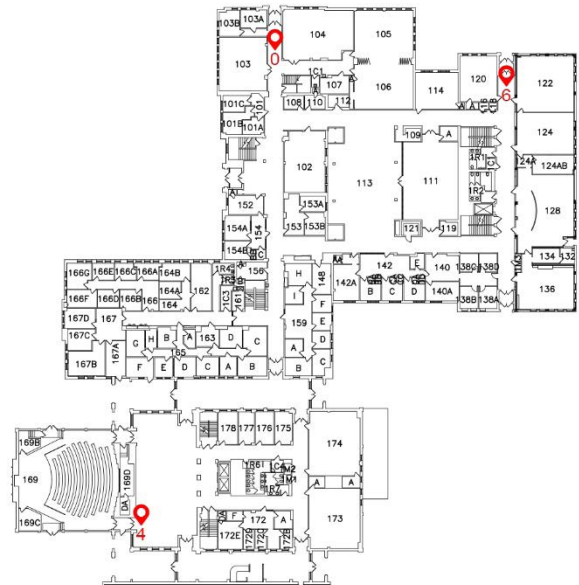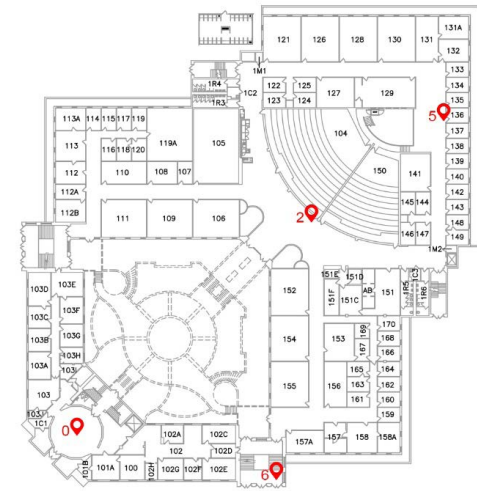
(b) First-floor plan

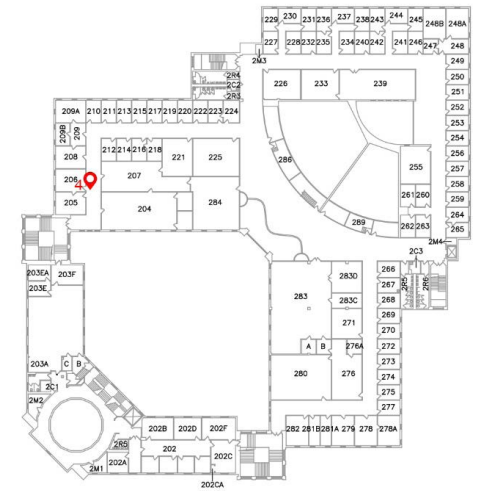(c) Second-floor plan

(d) Third-floor plan

Figure 2 / Floor plans of Building 2 (B2)

(a) Basement-floor plan

(b) First-floor plan

(c) Second-floor plan

RESULTS

Eleven participants finished all the tasks: six were females (55%) and five were males (45%). Subjects ranged in age from 18 to 33, with an average age of 23.2 years. Eight participants identified themselves as Caucasian, one Black/African American, one Latino, and one Asian (Table 2). Three participants started from B1, and eight started from B2.

Table 2 / Demographic Information of Participants

Subject ID	Sex	Age	Ethnicity	Task duration (minutes)
1	Female	18	Caucasian	113
2	Female	19	Caucasian	90
3	Female	19	Caucasian	92
4	Female	19	Caucasian	92
5	Female	21	Caucasian	106
6	Female	26	Caucasian	89
7	Male	20	Caucasian	81
8	Male	23	Black/African American	132
9	Male	28	Latino	106
10	Male	29	Asian	127
11	Male	33	Caucasian	88

Maps

In the following sections, results regarding maps are reported. Maps are a "diagrammatic, 2-dimensional representation of the global environment" (Pati et al., 2015, p. 50).

Information from Maps

The mismatch between the type of information provided by maps and the type of information participants had about the target determined whether maps were useful to them. For example, in B2, when participants had only room numbers, they could not use maps effectively because most were fire maps with no information regarding room numbers (Figure 3). Maps on each level often included information pertinent to that level. Thus, maps had low utility for participants searching for targets at a level other than their current one. However, maps were also instrumental for some participants to learn about other sections (regions) within a building and visualize the location of rooms.

When Maps Were Used

The evidence suggests maps were not often used as the first strategy. For example, in B1, the first wayfinding

task was introduced when participants stood by a map; however, only four out of eleven participants consulted the adjacent map. Observation suggests that participants tended to refer to maps more when given a room name (e.g., the lecture hall) or cardinal direction (e.g., the south entrance) as the target instead of a room number.

How Maps Were Used

Participants converted the information on maps into a series of route directions (i.e., actions).

Map Alignment

Maps were aligned with adjacent corridors at the study sites. However, some participants were perplexed because they were unaware of this fact. More importantly, when participants consulted maps in different corridors, they were confused because each map rotated differently to align with the adjacent corridor. One explanation for this confusion could be that to match the information on the two maps, participants needed to mentally rotate the memorized series of actions extracted from the first map, which imposed a cognitive load on them.

Map Design Issues

In B1, maps lacked a compass symbol indicating north, making it challenging for participants to identify targets with cardinal indicators. Contrary to participant expectations, the north did not correspond to the top of some maps because they were aligned with adjacent corridors. Also, it was not communicated on the maps that they aligned with the adjacent corridor, confusing some participants.

Some rooms were not labeled correctly on the maps. For example, the lecture hall in B1 was labeled as a class-room on the maps. Additionally, some participants had difficulties identifying stairs on the maps in B1 (Figure 4). In B1, some participants had difficulties distinguishing the inside from the outside when reading maps. For example, a participant thought the connecting hall in B1 was outside the building when consulting a map. For some participants, the icon used to indicate a person's current location on YAH maps (i.e., the university logo) was not easily perceived as the person's current location.
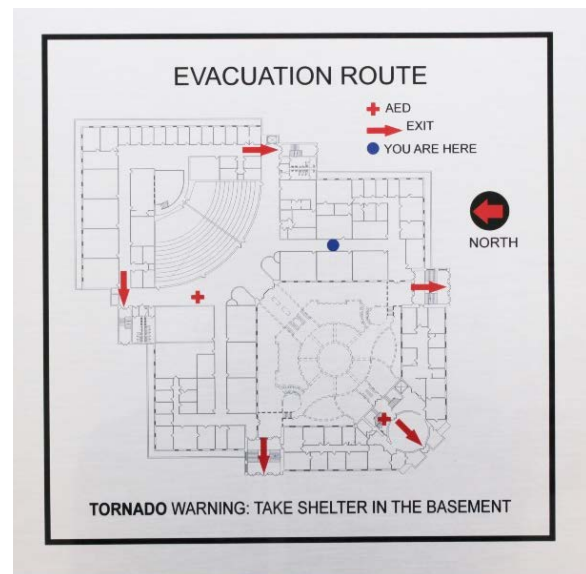
Figure 3

A Fire Map in B2

Figure 4

A Map in B1

Figure 5

A Room-Number-Range is an Example of a Categorical Sign in B2

Figure 6

An Example of a Factual Sign in B1

Signs

Signs are elements consisting of texts and graphics that provide directional (O'Neill, 1991a), identification, and instructional information about a building (Jamshidi, 2021). The following sections present results regarding signs.

Different Types of Signs

Four different types of signs were identified in the study sites: identification, categorical, factual, and directional signs. Identification signs are unique labels assigned to a spatial entity (e.g., room numbers). Categorical signs provide information regarding a group of spatial entities. For example, in B2, the signs of different departments and the room-number-range signs (Figure 5) were considered categorical signs. Factual signs provide a description of the circulation network. An example of a factual sign in B1 was a sign stating that "Rooms 63 and 69 are not accessible from this stairway" (Figure 6). Finally, directional signs suggest a course of action at decision points to move toward a target (e.g., a sign with an arrow).

Signs and Direction Type

The evidence suggests that the type of information participants were provided about targets influenced their preference for the type of signage they sought. For example, when participants' only information regarding targets was room names rather than room numbers, they tended to look for a directory. The following verbal protocol illustrates this point: "I am just going to wander until I see some kind of directory."

Understanding the Signs' Numbering System

Several participants did not initially recognize that the first digit of room numbers corresponded to the level of the building on which the room was located, negatively impacting their wayfinding performance.

Signs and Maps

Some participants used the information from signs (e.g., see the sign shown in Figure 7) and maps together to successfully perform wayfinding tasks. However, since maps were not necessarily located close to signs, participants probably memorized the information from the signs before finding a map. Some participants forgot what they had memorized by the time they found a map.

Signs and Regions

In B2, signs indicated the range of room numbers located in different building parts. This type of sign facilitated participants' wayfinding performance because they could find the correct region first, reducing the area they needed to search to identify a particular room. Additionally, in B2, the signage of different departments (i.e., a conceptual category type of region) on each floor was not visible from the main lobby, negatively impacting participants' performance.

Signs and Attention

In B2, a sign in the middle of one of the corridors was meant to prevent students from crossing the line on which the sign was placed (see Figure 8). Despite the intention for the sign's extreme visibility, the majority of participants walked past the sign.

Sign-Design Issues

In a directional sign in B1 (see Figure 7), two types of information were unclear to participants: (1) the use of cardinal directions and (2) the reference to the old part of the building when no other signs indicated the old and new parts of the building.

Participants tried to check room signs from a distance while standing at either end of the corridor. They did so to determine whether room numbers were increasing or decreasing without walking along the corridor. However, in study sites, signs were wall-surface mounted, making it difficult for participants to use this strategy. Using projecting signs rather than surface-mounted signs might have facilitated this process.

Figure 7

The Sign Instructed People to Walk Past the Dean's Office but Did Not Clarify its Location
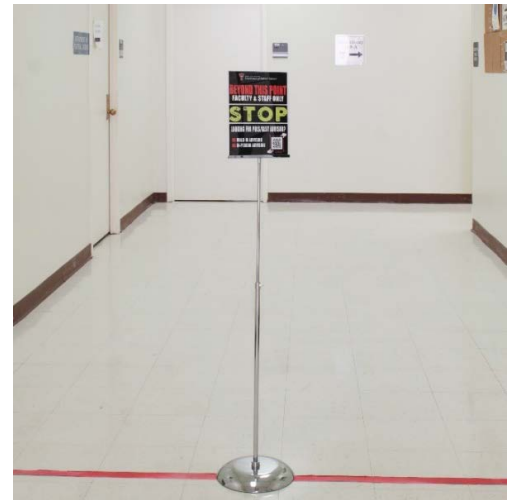
Figure 8

A Sign in the Middle of One of the Corridors Meant to Prevent Students From Crossing the Line on Which the Sign was Placed. Despite the Intention for the Sign's Extremely Visibility, the Majority of Participants Walked Past the Sign

31

DISCUSSION

Four noteworthy findings emerged from this study, each meriting further examination. First, it was observed that maps were not frequently used as the primary wayfinding strategy. However, the reasons behind this trend remain unclear. Two plausible explanations can be put forth to elucidate this observation. The first explanation suggests the maps available on each level predominantly contained information relevant only to that specific level, thereby decreasing their utility for participants engaged in multi-level wayfinding. Alternatively, the second explanation proposes that, in real-world wayfinding scenarios, individuals may display a preference for seeking assistance from other people to locate their target rather than relying on a map. Both of these explanations warrant deeper investigation to better understand the factors influencing wayfinding strategy choices and their implications for design and implementation of wayshowing systems.

The second noteworthy finding pertains to the confusion experienced by certain participants when consulting two maps that were rotated differently to align with their respective adjacent corridors. This finding contradicts the results of Levine et al.'s study (1984). However, it is plausible that Levine et al. (1984) did not account for the real-world complexity where multiple maps in a building may be oriented differently based on their specific locations, and individuals may need to refer to several maps during their wayfinding journey. This particular factor warrants further in-depth research to explore the impact of map orientation variations on users' wayfinding efficiency and cognitive processes.

Third, when participants did not have any information about the floor on which the target was located, maps had low utility since they only had access to the map of their current floor. Accordingly, providing a complete set of building maps at all levels may better facilitate wayfinding. To that end, digital screens can be used to save space. Furthermore, it is suggested that, along with maps, a three-dimensional bird's-eye view of the building be used to introduce the different parts and regions of the building. This strategy can be especially important in buildings with multiple parts with a different number of levels in each part. These suggestions constitute design hypotheses that could be the subject of future studies.

Finally, in this study, participants found targets relatively more easily when given room numbers instead of room names or cardinal directions. This phenomenon may be explained by the fact that the initial digit in room numbers indicates the vertical region (i.e., the level) in which the room is located. Thus, participants could focus their efforts on a smaller region. Accordingly, it can be hypothesized that dividing each level into different regions and incorporating them into the numbering system can improve wayfinding performance. For example, room 3B10 would be in region B of the third floor, and the room number would be 10. This is yet another hypothesis for examination in future studies.

Limitations

This study employs a grounded theory approach to explore the role of signage and maps in interior wayfinding. While this methodology facilitates the generation of rich, in-depth insights and theories emerging directly from the data, it also brings inherent limitations that must be acknowledged. Notably, the findings derived from a grounded theory approach are inherently exploratory and conceptual in nature. They serve as a foundational step toward understanding complex phenomena, providing a theoretical framework that captures the nuances and dynamics observed within the data. However, the generalizability and applicability of the findings of the current study are subject to limitations. Grounded theory constructs are not meant to assert universal truths but to propose hypotheses and theoretical insights that require further empirical testing and validation. In this vein, it is imperative to approach the application of the findings with caution in different or broader contexts. Therefore, it is strongly recommended that the propositions and conceptual frameworks derived from this study be subjected to rigorous empirical testing in diverse settings and populations.

Apart from that, this study has four other limitations. The first limitation of this study relates to the study setting. In this study, participants performed wayfinding tasks in only two buildings, both of which were university buildings. Having a greater number of buildings with different attributes can enrich the findings of this study. Additionally, including other building types, such as hospitals and

airports, can result in different findings because different types of signs and maps are possibly used in other building types that are different from those used in university buildings.

The second limitation relates to the similarity of participants' experience with the actual wayfinding process. Users may have different experiences depending on the situation in which they are performing wayfinding. For example, evidence suggests people might use signage differently depending on whether they are in an emergency or a non-emergency situation (Vilar Rebelo, Noriega, Duarte et al., 2014). Accordingly, the generalizability of this study's findings to other situations is limited.

The third limitation of this study relates to the participants of this study. All participants were young, educated adults. Including participants with other characteristics (such as older adults or less educated people) may result in different findings.

Finally, the data collection process might have impacted participants' thought processes. Since participants were asked to think aloud, this process might have taxed their cognitive processing capacity and altered their wayfinding performance.

CONCLUSION

The findings presented in this study shed light on the potential inaccuracies of assumptions governing the design and placement of maps and signages, ultimately impacting their effectiveness in aiding users during wayfinding. In light of these revelations, it becomes evident that additional exploratory studies are imperative to thoroughly assess the efficacy of these wayshowing systems within diverse building types and real-world scenarios.

By acknowledging the limitations of current practices, future research endeavors can delve deeper into the intricacies of wayfinding processes and develop more informed strategies to enhance user experiences. Investigating the actual navigation behavior of individuals within various architectural environments will offer valuable insights and inform the refinement of wayshowing elements to better align with users' cognitive processes and expectations.

Furthermore, the implications of this study extend beyond academic circles, reaching architects, designers, and facility managers responsible for creating user-friendly spaces. Understanding the impact of wayshowing systems on individuals' navigation can significantly contribute to the creation of more efficient, accessible, and user-centric built environments.

DECLARATION OF CONFLICTING INTERESTS

The Authors declare that there is no conflict of interest.

REFERENCES

Arthur, P., & Passini, R. (1992). *Wayfinding: People, signs, and architecture*. McGraw-Hill Book Co.

Birks, M., Chapman, Y., & Francis, K. (2008). Memoing in qualitative research: Probing data and processes. J*ournal of Research in Nursing*, 13(1), 68–75. DOI: http://dx.doi.org/10.1177/1744987107081254

Butler, D. L., Acquino, A. L., Hissong, A. A., & Scott, P. A. (1993). Wayfinding by newcomers in a complex building. *Human Factors*, 35(1), 159–173. DOI: http://dx.doi.org/10.1177/001872089303500109

Charmaz, K. (2014). *Constructing grounded theory* (2nd ed.). Sage.

Chen, C.-H., Chang, W.-C., & Chang, W.-T. (2009). Gender differences in relation to wayfinding strategies, navigational support design, and wayfinding task difficulty. J*ournal of Environmental Psychology*, 29(2), 220–226. DOI: http://dx.doi.org/10.1016/j.jenvp.2008.07.003

Cope, J., Lutz, J., Ironsmith, M., & Elbert, E. (1999). Use of signs to enhance way-finding in a university bookstore. *Perceptual and Motor Skills*, 88(3), 1271–1279. DOI: http://dx.doi.org/10.2466/pms.1999.88.3c.1271

Golledge, R. G., & Stimson, R. J. (1997). *Spatial behavior: A geographic perspective*. Guilford Press.

Haq, S., & Zimring, C. (2003). Just down the road a piece: The development of topological knowledge of building layouts. *Environment and Behavior*, 35(1), 132–160. DOI: http://dx.doi.org/10.1177/0013916502238868

Hashim, M. J., Alkaabi, M. S. K. M., & Bharwani, S. (2014). Interpretation of way-finding healthcare symbols by a multicultural population: Navigation signage design for global health. *Applied Ergonomics*, 45(3), 503–509. DOI: http://dx.doi.org/10.1016/j.apergo.2013.07.002

Hölscher, C., Büchner, S. J., Meilinger, T., & Strube, G. (2009). Adaptivity of wayfinding strategies in a multi-building ensemble: The effects of spatial structure, task requirements, and metric information. *Journal of Environmental Psychology*, 29(2), 208–219. DOI: http://dx.doi.org/10.1016/j.jenvp.2008.05.010

Jamshidi, S. (2021). *Identifying elements of the interior environment that contribute to wayfinding cognitive processes* [Unpublished doctoral dissertation]. Texas Tech University.

Jamshidi, S., Ensafi, M., & Pati, D. (2020). Wayfinding in interior environments: An integrative review. *Frontiers in Psychology*, 11. DOI: http://dx.doi.org/10.3389/fpsyg.2020.549628

Jamshidi, S., & Hashemi, S. (2020, October 9). *Interior wayfinding: Two different approaches in addressing wayfinding problems within interior environments* [Conference presentation]. IDEC Virtual Symposium.

Jamshidi, S., & Pati, D. (2020). A Narrative review of theories of wayfinding within the interior environment. *HERD: Health Environments Research & Design Journal*, 14(1) 290–303. DOI: http://dx.doi.org/10.1177/1937586720932276

Jamshidi, S., & Pati, D. (2024). Identifying environmental elements and attributes that contribute to indoor wayfinding: An exploratory study utilizing think-aloud protocol. *Journal of Interior Design*, 49(2), 117–138 DOI: http://dx.doi.org/10.1177/10717641231207031

Joy Lo, C.-W., Yien, H.-W., & Chen, I.-P. (2016). How universal are universal symbols? An estimation of cross-cultural adoption of universal healthcare symbols. *HERD: Health Environments Research & Design Journal*, 9(3), 116–134. DOI: http://dx.doi.org/10.1177/1937586715616360

Levine, M., Marchon, I., & Hanley, G. (1984). The placement and misplacement of you-are-here maps. *Environment and Behavior*, 16(2), 139–157. DOI: http://dx.doi.org/10.1177/0013916584162001

Li, R., & Klippel, A. (2016). Wayfinding behaviors in complex buildings: The impact of environmental legibility and familiarity. *Environment and Behavior*, 48(3), 482–510. DOI: http://dx.doi.org/10.1177/0013916514550243

Lu, Y., & Ye, Y. (2019). Can people memorize multilevel building as volumetric map? A study of multilevel atrium building. *Environment and Planning B: Urban Analytics and City Science*, 46(2), 225–242. DOI: http://dx.doi.org/10.1177/2399808317705659

Meilinger, T., Hölscher, C., Büchner, S. J., & Brösamle, M. (2006). How much information do you need? Schematic maps in wayfinding and self localisation. In T. Barkowsky, M. Knauff, G. Ligozat, & D. R. Montello (Eds.), *Spatial Cognition V Reasoning, Action, Interaction* (pp. 381–400). Springer Berlin Heidelberg. DOI: http://dx.doi.org/10.1007/978-3-540-75666-8_22

Montello, D. R., & Sas, C. (2006). Human Factors of Wayfinding in Navigation. In W. Karwowski W. (Ed.), *International Encyclopedia of Ergonomics and Human Factors* (pp. 2003–2008). CRC Press/Taylor & Francis, Ltd. DOI: http://dx.doi.org/10.1201/9780849375477.ch394

O'Neill, M. J. (1991a). A biologically based model of spatial cognition and wayfinding. *Journal of Environmental Psychology*, 11(4), 299–320. DOI: http://dx.doi.org/10.1016/s0272-4944(05)80104-5

O'Neill, M. J. (1991b). Effects of signage and floor plan configuration on wayfinding accuracy. *Environment and Behavior*, 23(5), 553–574. DOI: http://dx.doi.org/10.1177/0013916591235002

Pati, D., Harvey, T. E., Willis, D. A., & Pati, S. (2015). Identifying elements of the health care environment that contribute to wayfinding. *HERD: Health Environments Research & Design Journal*, 8(3), 44–67. DOI: http://dx.doi.org/10.1177/1937586714568864

Richardson, A. E., Montello, D. R., & Hegarty, M. (1999). Spatial knowledge acquisition from maps and from navigation in real and virtual environments. *Memory & Cognition*, 27(4), 741–750. DOI: http://dx.doi.org/10.3758/bf03211566

Thorndyke, P. W., & Hayes-Roth, B. (1982). Differences in spatial knowledge acquired from maps and navigation. *Cognitive Psychology*, 14(4), 560–589. DOI: http://dx.doi.org/10.1016/0010-0285(82)90019-6

Vilar, E., Rebelo, F., & Noriega, P. (2014). Indoor human wayfinding performance using vertical and horizontal signage in virtual reality. *Human Factors and Ergonomics in Manufacturing & Service Industries*, 24(6), 601–615. DOI: http://dx.doi.org/10.1002/hfm.20503

Vilar, E., Rebelo, F., Noriega, P., Duarte, E., & Mayhorn, C. B. (2014). Effects of competing environmental variables and signage on route-choices in simulated everyday and emergency wayfinding situations. *Ergonomics*, 57(4), 511–524. DOI: http://dx.doi.org/10.1080/00140139.2014.895054

Wright, P., Hull, A. J., & Lickorish, A. (1993). Navigating in a hospital outpatients' department: The merits of maps and wall signs. *Journal of Architectural and Planning Research*, 10(1), 76–89. http://www.jstor.org/stable/43029277

The Journey to the Grave – Evaluating a Swiss Cemetery Wayfinding System Using Shadowing Techniques

Harald Klingemann*

Bern University of Applied Sciences
Bern Academy of the Arts,
Institute of Design Research (IDR)
Bern, Switzerland

*Corresponding author
Harald.Klingemann@bfh.ch

Jimmy Schmid

Bern University of Applied Sciences
Bern Academy of the Arts,
Institute of Design Research (IDR)
Bern, Switzerland

Andrea Umbricht

Project Manager, Consultant, and Executive
Board Member
gfs-zürich, Market and Social Research

Daniela Rota

Art Director and Partner
m—d—buero design and research

Nicole Hametner

Photography

Note

Additional images to provide context for this article can be found on pages 51-58.

INTRODUCTION

Signage – A System for Orientation and Information

Signage systems combine different design disciplines with the communicative intention of assigning a specific place its own, individual visual profile. Intelligent, sustainable systems of orientation and information guide and accompany a visitor while enabling them to experience the space in question, creating a sense of identification and identity. This discipline operates at the interface between graphic design, communication design, industrial design, scenography, architecture, interior design, landscape architecture, and urban and regional planning. This interdependence means that signage requires an interdisciplinary approach and perspective (Schmid, 2013).

Signage communicates by means of writing, typography, signs, pictograms, and colors on different materials. These signs are intended to ensure that people unfamiliar with an area can reach their desired destination and, depending on the context, are also informed about the locality. Signage uses visual, haptic, and auditory media to help people find their way around a space. Employing signs and elements that suit different needs can help to ensure that the recipients' varying capacity to process information is taken appropriately into consideration.

Abstract

Signage is an aid to wayfinding and individual orientation in both organisations and everyday life. It aims to respond to users' needs. Whether or not it actually succeeds in this can only be empirically verified by an evaluation that is tailored to the context in question. Spacious cemeteries are a particularly interesting case, as they are a place both of mourning and of relaxation. When visitors in a fragile emotional state want to find their way to a grave, they have to be able to depend on particularly effective signage. The present study of a pilot project at the Zurich Sihlfeld Cemetery in 2022/2023 uses a "shadowing" methodology in such a context for the first-ever time. This is because other common approaches to evaluating signage are inappropriate here for ethical reasons – whether these be surveys, giving test subjects specific search tasks, or using eye-tracking. We observed and assessed 49 target persons across all the segments of the cemetery in their general orientation behaviour, the degree to which they consulted the signage offered, and their use of other aids on their way to the burial in question. We used our observations to analyse deviations from the ideal access routes; our photographic records provide us with a basis for further optimisation measures.

Signage concepts are based on a classical communication model, according to which an act of communication always features a sender and a recipient (Watzlawick et al., 2016). An optimal system of orientation and information will send out signs and signals that the receivers can decode and understand. In this context, it is further assumed that a hierarchy of information can help structure the information communicated and make it easier to comprehend. The ordering principle in signage ("orientation – direction – identification") serves as the basis for signage-system planning (Mollerup, 2005). To what extent a signage system meets all these requirements in practice is something that has to be tested empirically, with the suitability of the possible evaluation methods being derived from the conditions on the spot. This is illustrated by the following case study, in which the shadowing method is used to evaluate a wayfinding system at the largest cemetery in the city of Zurich.

Case Study Sihlfeld Cemetery in Zurich – Starting Point

The city of Zurich runs 19 cemeteries with a surface area totaling 1,289,000 square meters. Roughly 2,900 burials or interments take place there each year. The signage in the Zurich cemeteries has up to now been somewhat ineffective, contrary to its actual objectives. It used to be difficult for many visitors and family members to find their way around the cemeteries: in some cases, in fact, quite impossible. Time and again, visitors were unable to find their way to funeral services, graves, or toilet facilities. Information on burials, interments, and grave removals would be posted on the central notice board and sometimes at the grave plots in question. The cemetery offices, which serve as enquiry points, are irregularly staffed and deserted on evenings and at weekends.

To remedy these deficiencies, the municipal office responsible (*Grün Stadt Zürich*) launched a study in 2019 to choose a planning team suited to developing a site-specific signage concept for the city's cemeteries, a concept that would also promote the creation of a specific identity for them. The team would be responsible for implementing a pilot project at the Sihlfeld cemetery and then utilize their experiences and the feedback acquired to create a definitive signage manual for the cemeteries of the city of Zurich.

The signage at the city's cemeteries should demonstrate a uniform approach to design, color, and material language, both outside on the cemetery grounds and in the public buildings on the site. By combining visitor and service information, everyone ought to be sure of receiving the information they need in an intuitive and targeted manner. *Grün Stadt Zürich* wanted a unified signage system not least to provide better wayfinding guidance for visitors, family members of the deceased, and clients.

The new signage system, entitled "Memory Landscapes" was introduced in 2022 and provided a new orientation plan that aimed to achieve its impact through iconographic representations of the architecture and by introducing individualized reference sites ("Plätze") throughout the cemetery. It was hoped that creating easily recognizable elements would reduce complexity in a small space and create a clear means of addressing the visitors. What's more, the best route is shown clearly. The information hierarchy was devised and formulated in detail. This signage concept "Memory Landscapes" was subjected to a partial evaluation in 2022/2023.

Evaluation Approach

The focus of the evaluation presented here is on problems faced when finding one's way to a funeral. This is because the cemetery administration had practical past experience of a significant need for improvement in this area. Evaluation approaches that used surveys, guided interviews, focus-group interviews, giving test persons specific search assignments, or using eye-tracking were all impossible to adopt because of the precarious, emotionally sensitive situation of the mourners who were the target persons. In this situation, the obvious decision was to resort to the method of shadowing, which is generally used in other contexts. It is a technique in user research where the researcher accompanies the user and observes how a product or service is employed in a natural environment. Shadowing helps the researcher comprehend existing behavior so designs can be adapted to it (Interaction Design Foundation [IxDF], 2020). From a wider perspective,

Quinlan (2008) further emphasizes that the use of shadowing is particularly effective in exploring *behavior in everyday life*: "Shadowing entails a researcher closely following a subject over a period of time to investigate what people do in the course of their everyday lives, not what their roles dictate of them" (Quinlan, 2008, p. 1482).

Müller and Straatmann (2011) sum up the advantages of observation methods: "Observation as a means of data collection allows one to make an authentic record of situational circumstances in combination with people's behavior at the time . . . One of the main advantages of observation is that actual behavior can be captured directly and in the moment that it occurs. With a survey-based approach, however, one is compelled to rely on retrospective reports" (p. 329). More specifically, shadowing is a form of nonparticipant observation where the researcher only observes and records the behavior and emotions of the target person. The focus is on behavior, not opinions.

"Shadowing" is used to describe a technique for learning language—thus "a learner repeats what he/she is listening to, just as a shadow follows someone walking" (see e.g., Hamad, 2019), though it is also utilised in market research for analysing service processes, in organisational research (institutional ethnography; e.g., Possas & Medeiros, 2017), and as a job-training method (e.g., McDonald, 2005). In the case of service quality and customer behavior, a study by Gimpel et al. illustrates the possibility of using "shadowing" to evaluate wayfinding at an international airport (Gimpel, 2021); in other words, shadowing was used to track and map a passenger's "journey" within an airport, combined with subsequent interviews.

Shadowing techniques are increasingly being used in healthcare settings, such as for observing unresponsive patients and disabled people (e.g., Tyldesley-Marshall et al., 2020; van der Weele & Bredewold, 2021). Kevdzija and Marquardt (2022) used the "observe only approach" (in view of the speech impairments of patients) to investigate wayfinding among stroke patients in the built environment of a rehabilitation clinic where the distance between the patients' rooms and the therapy rooms is challenging. Gualandi et al. (2019) used shadowing to explore a hospital patient's journey from admission to discharge. The observational data acquired were combined with patient and staff interviews to highlight the patients' principal emotions. The "shadowed" patients gave their consent, and this in itself might well have influenced their behavior while they were shadowed.

When evaluating wayfinding systems in healthcare, Bubric et al. (2021) applied a user-centered approach. Participants were asked to complete X number of routes in an allotted space using proposed signage and other wayfinding strategies, the goal being to identify opportunities for improvement. In preventive healthcare, so-called behavior settings theory is drawn upon when using shadowing to observe behavior in daily life, and to provide more informative prevention messages (Park et al., 2022).

All of the above studies were situated in an organizational framework or private settings in which shadowing was contingent upon the informed consent of the participants, and complementary interviews had to be conducted. This naturally resulted in numerous ethical and methodological problems (Johnson, 2014). The "observe only" shadowing approach of the present study was used to evaluate the wayfinding behavior of visitors at a funeral (in other words, the "journey to the grave"), and since the Zurich Sihlfeld cemetery is an open, public space, there was no need to brief the visitors being observed. This meant we were able to analyze their wayfinding behavior in a natural, unbiased context.

Objective

The objective of the present study is to explore the circumstances related to signage and other general factors that contributed to the late arrival of visitors for a scheduled funeral, and then to outline possible improvements to the current wayfinding system. The results of this study will help to determine important planning principles in a manual for a new signage system at all cemeteries in the city of Zurich from 2024 onwards.
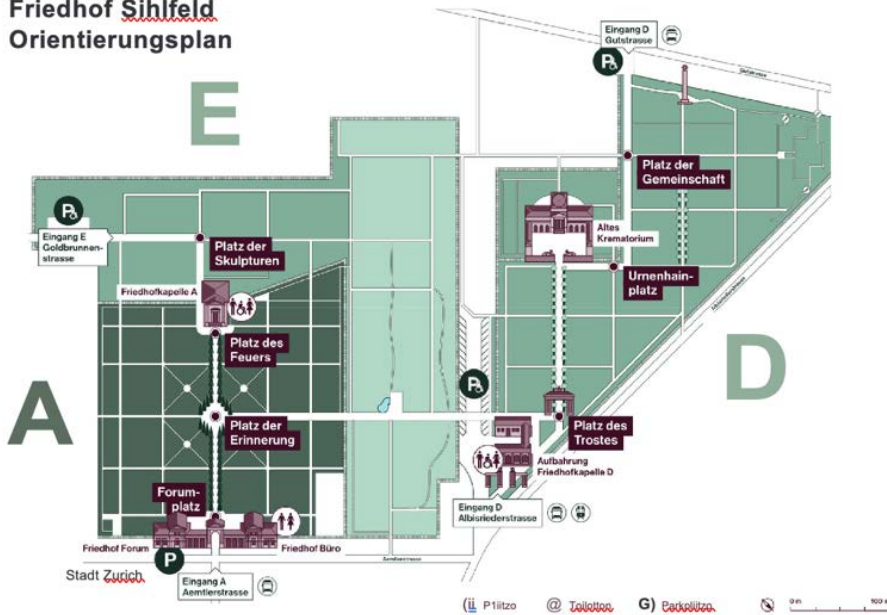
Image 1

Sihlfeld Cemetery (28.5 Hectares) – Orientation Plan

METHODS

We carried out a stratified quote sample with regard to the 8 observation days available to us, the burial sector, the access routes to the burial site to be observed, and the selection of the people to observe on these routes.

Local Selection of the Burials to be Observed and the Observation Days

To get a representative, overall picture of orientation requirements, burials, and interments had to be taken into account in all sectors (A, D, E); see Image 1. When burials and interments were to take place at the same time, those in sectors A and E were to be preferred for observation because burials occur less frequently there. Our aim was also to observe burials and interments in communal burial plots and at individual burial sites. Whenever possible, half-days were selected on which at least two burials/interments were to take place one after the other so we could carry out as many observations as possible.

Determining the Access Routes to a Destination (the Grave and the Burial Area) Where People Were to be Observed

The "shadowing" was assigned either to the route "entrance – reference site ("Platz") – grave" or to "entrance – chapel." For each burial selected, the signage concept defined an ideal entrance and a subsequent ideal access route (see Image 2). Observers were positioned at the entrance defined as the starting point.
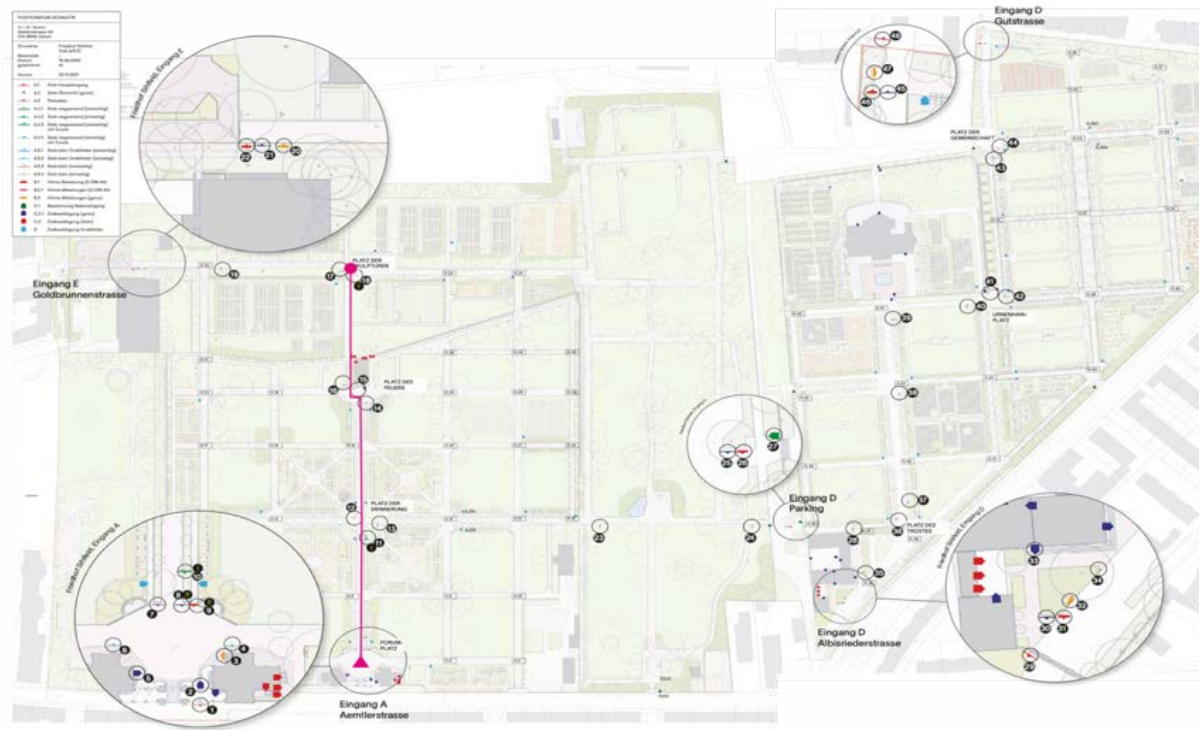
Image 2

Ideal Route to the Funeral, Based on the Signage Concept: Example for Target Sector E

Selection of Target Persons to be Observed

Mourners who came to the cemetery for a burial/interment were relevant for shadowing; we excluded those visiting graves, those using the area as a park and those just out walking. As far as possible, we took care to include people with notable characteristics that could potentially impinge on their ability to orientate themselves, such as the visually impaired and people with limited mobility. Our selection of mourners was made as randomly as possible. In the case of groups of grieving persons, we selected a "leader" from among them who determined the direction they took.

Field Organisation/Procedure

Over 8 days, two observers were deployed simultaneously for 4 hours (i.e., one half-day). They had all been trained in detail in advance and had been instructed in how to use the observation form. As a rule, 2 days before the survey days were planned, the cemetery office would inform the project managers about the burials that were due to take place. As soon as it was decided which burials should be observed, staff from the m—d—buero design and research, who were responsible for the signage concept, drew up an ideal route for each burial/interment. Once on site, observers were given a printed-out map of the Sihlfeld cemetery with the ideal paths and starting positions marked on it.

Observation Procedure

A mourner arrives early at the predefined entrance and is then shadowed as they move towards the grave. The person observing then goes back to the ideal entrance and observes the next person. This means there is usually more than one observation made for each burial route.

In the event a target person realized they were being observed, the observers were provided with an official letter. The observers were also given official ID cards by the survey institute GFS-Zürich to identify them as observers/survey team members and to legitimize their presence at the Sihlfeld cemetery, should they be approached. No one confronted the observers with shadowing, but two people were on the brink of asking for help/directions. One person was a young woman with a child and was visibly stressed out. Some eye contact was made and if the observer had been closer, he/she probably would have been asked for assistance.

Instrument

The observers/shadowers were each given a map of the cemetery on which the ideal routes were marked for reaching the planned burial. During the observation process, the shadower marked the path actually chosen and traversed; *event codes* were entered on the map in line with an observation sheet on which the observers recorded the following:

- The behavior of the target person when taking their route, in particular any deviations from the ideal route, and the punctuality of their arrival at the place of burial. The place at which the person being observed deviated from the ideal route for the first time was recorded by means of additional photo documentation.
- The target person's use and/or observance of signage elements when following their route was determined according to a three-stage differentiation model provided in advance by m—d—buero, and was then entered onto the observation map;
- Any other orientation aids used by the target person were noted according to type (maps, mobile phones, other people, etc.) as was the extent to which such aids were used by them;
- The target person was categorized according to gender and age, and the observer noted their mental state and any impairments on their part;
- Any notable characteristics of the context were recorded, such as acts of group orientation, the weather, and any additional or explanatory comments by the observers.

The data, including open questions and comments, were processed using the software SPSS Statistics 29 0.1.1.

RESULTS

1. Observation Sample

On 8 observation days from 23 March to 8 August 2023, 49 people were "shadowed" at 17 burials. These included 14 burials in Sector D (41 observations), one burial in Sector A (seven observations), and two burials/interments in Sector E (six observations). This distribution accurately reflects the burial statistics for 2022: out of a total of 412 burials or interments, 77% took place in Sector D, 16% in Sector E, and 7% in Sector A (personal communication from S. Brunner, Product Manager of *Grün Stadt Zürich*, on 7 February 2023). This means the data gathered is at least partially representative of the burials in the various sectors. .

As mentioned above, when selecting the people to be observed, the project managers endeavored to achieve the most diverse possible sample group that was socio-dynamically as representative as possible. Men and women were almost equally represented among those observed (47% were men, 53% women); people in pairs were observed the most often on their way to a burial site (43% of whom were men, 39% women), but, at the same time, people moving in groups were observed (these were predominantly women, at 38% compared to 22% who were men); finally, individual visitors were also observed (35% men vs 23% women). The estimated age of the people observed meant our sample had a near-normal distribution across different age groups.

Table 1 / Sample Characteristics: Age Group by Gender

	Estimated age group		Older than	
	18–39	40–59	60	Total
Male	n = 2	n = 10	n = 11	n = 23
Female	8	14	4	26
	80.0%	58.3%	26.7%	53.1%
Total	10	24	15	49
	100.0%	100.0%	100.0%	100.0%

It is not possible to undertake any benchmarking with regard to the individual and contextual characteristics of the people being observed (which was indeed possible with the statistics available for burials by sector, as explained above). But at the same time, it seems plausible that the observation data collected here do not depict any extreme or atypical situations. As far as the *validity* of the data is concerned, it is significant that these observations were well spread across the different "shadowers" employed (no single observer made more than 37% of the observations), so we do not have to anticipate any undesirable fatigue effects or learning effects.

2. Criteria for Success

Our evaluation's core aim was to determine the extent to which the new signage concept can prevent or reduce the *late arrival of mourners at the burial site*, something that was often observed and criticized before the signage was introduced. In this regard, it is assumed in each individual case that following the route marked out—which here means *taking the ideal route*—plays an important role.

We recorded the exact amount by which the arrival time of the people shadowed was divergent from the officially scheduled starting time of the burial. Of the 49 "shadowings" conducted, some three-quarters of the mourners (*n* = 36; 74%) arrived on average 11 minutes before the start of the funeral, while a quarter (*n* = 13; 27%) arrived on average 10 minutes after the start (see Table 2).

Table 2 / Arrival Time Deviations, Based on the Official Schedule of the Funeral

Latecomers	n (%)	Early birds	n (%)
1–3 minutes late	7 (54%)	5–9 minutes early	16 (44%)
8–10 minutes	3 (23%)	10–15 minutes	11 (31%)
11–45 minutes	3 (23%)	16–32 minutes	9 (25%)
	13 (100%)		36 (100%)

Relationship Map

Figure 1

Lateness of Visitors Exiting or Following the Ideal Route, in Minutes (n = 13)
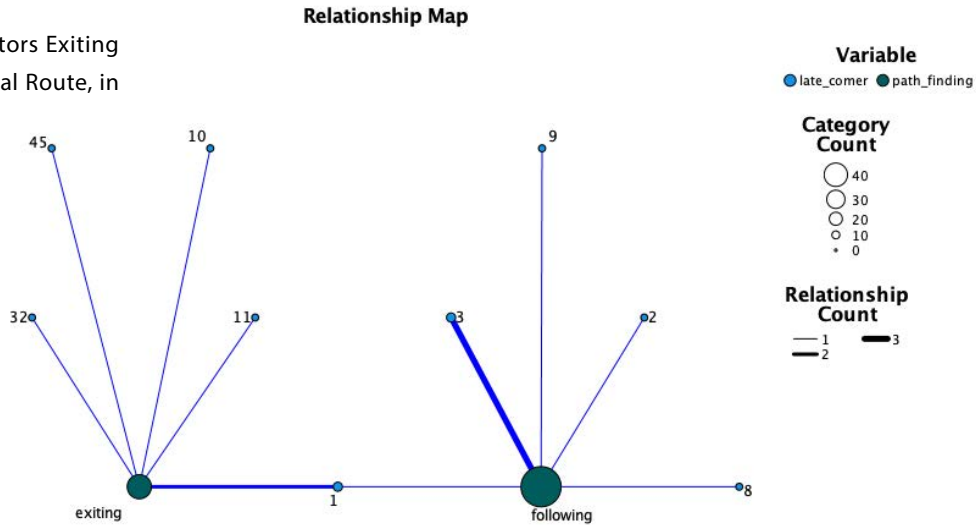
Twenty-seven percent of mourners arriving too late is a considerable amount and suggests a need for adjustment. It means there should be a detailed examination of the extent to which the signage on the access routes might be a contributing factor. There may also be weak points in the communication chain because in two cases much of the delay can be attributed to the mourners having arrived too late at the cemetery (23 and 40 minutes, respectively). Either they did not receive any advance information on the size of the cemetery, or they received it but ignored it. It should be noted that the act of shadowing made it possible to record people's arrival times accurately; this would hardly have been possible if retrospective surveys had been employed instead.

We have to ask whether the time deviations depend on whether or not people follow the ideal route according to the signage concept, and to what extent adjustments to the signage could prevent these delays. Further analysis shows that in 25 out of 49 cases (51%), there was at least one deviation from the ideal route. However, a closer look revealed that eight of those people diverged from the ideal route because they were following the example of others. This cannot be "blamed" on the signage. The remaining 17 people who took a divergent path (35%) thus form our central reference group for investigating the reasons for people leaving the ideal route.

We must examine the extent to which people's arrival time and their adherence to the ideal route are related to each other. Are those who take a divergent route also typically those who arrive late? Of the 17 who took a divergent route, 35% (n = 6) arrived late, compared to only 22% (n = 7) of the 32 who took the ideal route. However, this difference is significantly relativized if we consider the uneven distribution of the delay times. On closer inspection, the "latecomers" represent a far more heterogeneous group than the "early birds," which is expressed in a standard deviation that is twice as high (sd = 13.4 vs sd = 6.9). The following visualization (see Figure 1, "Relationship Map") clearly shows that those who deviated from the route had *far higher* delay times (between 1 and 45 minutes) than those who were faithful to the route (1 to 9 minutes). However, we must also consider that a significantly late arrival time at the cemetery played a role in two cases.

Conclusion

Following the ideal route influences one's arrival time at one's destination, and a detailed examination of the 17 cases of divergence from the ideal route is therefore important if we are to make any appropriate signage adjustments. Other determining factors and influencing variables such as the use of orientation aids and characterizing the behavior of the persons shadowed could quite possibly be utilized to implement improvements, independent of the signage.

3. Influencing Factors on Wayfinding

General Signage

The observers recorded not just whether people kept to the ideal route but also the extent to which the target person accepted what the signage "offered" (i.e., if they gave the various signage elements their attention, and if so, for how long). The signage elements were categorized by the signage developers in advance as either "very important," "important," or "unimportant." For purposes of further analysis, the percentage of all signage elements that received attention was calculated to illustrate their "utilization success" with visitors.

What significance does using signage elements on the ideal route have for those who deviate from it? Table 3 shows that people tend to adhere more to the ideal route the more attention they pay to the signage elements. Ignoring the "unimportant" signage elements is of no consequence, but those who deviate from the ideal route reveal a higher proportion of nonobservance (0% means they paid no attention to any elements on the route) than among those who adhered to it, namely 94% vs 72% for the "important signage elements," and 65% vs 41% for the "very important" elements.

Table 3 / Degree of Attention Paid to the Signage, According to Importance and Fidelity to the Ideal Route

Degree of attention given	Pays attention to "unimportant" signage elements		Pays attention to "important" (!) signage elements		Pays attention to "very important signage elements"	
	Adheres to route	Diverge	Adheres	Diverges	Adheres to route	Diverges
0% (none)	n = 24 (75%)	n = 13 (77%)	23 (72%)	16 (94%)	13 (41%)	11 (65%)
1–25%	n = 8 (25%)	n = 4 (23%)	2 (6%)		2 (6%)	
26%–50%			6 (19%)	1 (6%)	7 (22%)	1 (6%)
51%–75%			1 (3%)		6 (19%)	4 (24%)
76%–100%					4 (12%)	1 (6%)
	N = 32 (100%)	N = 17 (100%)	N = 32 (100%)	N = 17 (100%)	N = 32 (100%)	N = 17 (100%)

Commentary: The total number of signage elements on each ideal route was related to the actual degree of attention they were given and their use, depending on the importance assigned to them: 100% means all the elements that can be consulted along the ideal route were actually used; 25% means, for example, that only a quarter of the elements on the ideal route in question (regardless of whether this was long or short) were consulted.

These group differences confirm our assumptions, though 75% of those adhering to the ideal route still followed it despite ignoring the "important" elements, with 41% of them doing so despite ignoring its "very important" elements. This indicates other factors may be involved in influencing the path people take that could not be registered by our study (such as people possessing prior information or familiarity with the cemetery, etc.).

Other Factors

The extent to which people use various aids for orientation and wayfinding can be interpreted as a means of compensating for gaps and weaknesses in the signage. At the same time, by naming the different reference sites ("Plätze") and principal axes

in the cemetery, the current signage concept makes it easier for people to identify where they are when trying to find their way around.

The observers therefore noted when a target person resorted to the use of other aids while walking, and for monitoring/relativization purposes they also assessed their state of mind and behavior.

Wayfinding Aids

When people sought help to find their way, their primary resort was to use their mobile phone, either to call up Google Maps or to contact other people; the next most frequent tactic was to seek advice from others in the cemetery (see Table 4). The locations where such aids were most often used were the Platz des Trostes and K38 (K=Kreuzung=intersection 38 on the cemetery plan).

Table 4 / The Use of Wayfinding Aids on the Spot

| Where was the aid used? At a specific site ("Platz")/intersection	Checks mobile	Googles on mobile	Printed map	Sympathy card	Asks groundsman	Asks someone else	Total
Intersection 38, "Platz des Trostes"	1	1	3	1			6
Forumplatz	2	2					4
K37	1				1		2
Entrance D, Car park	2					1	3
Urnenheinplatz		1				3	4
Platz der Skulpturen						1	1
Intersection 36		1					1
K41		1			1		2
K43			1				1
K42			1				1
K32					1		1
K47					1		1
Total	6	6	5	1	4	5	N = 27

Condition of The Target Person

Fifteen people gave the impression that they were "stressed" or "confused," and 15 people also "stopped and looked around in a searching manner." Two people who were shadowed also walked back part of the way. If we add these responses together (multiple responses were possible) to construct a summative assessment of stress, we find that 49% of the mourners observed ($n = 24$) were not stressed (i.e. there was no mention of the above-mentioned individual indicators); 33% ($n = 16$) had one stress indicator and a group of 18% ($n = 9$) showed two to four signs of stress. If we consider the places where "looks around in a searching manner" was indicated, we find it applies across a broad area, with the following locations listed more than once: K15 (three mentions), then Forum-Platz, Urnenhainplatz, K37, and K43 (with two mentions each).

Finally, as the following table shows, the level of stress observed had at least a moderate influence on the degree to which people adhered to the ideal route. Those who left the route

Figure 2

Stress level and adhering to the path
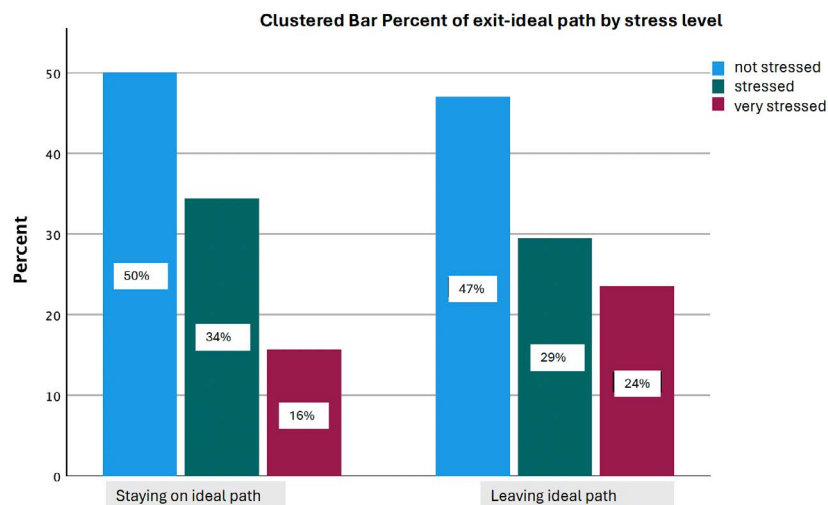
accounted for 24% of the mentions of their being "very stressed" compared to 16% among those who adhered to the path (see Figure 2).

Stress levels and the use of wayfinding aids are circumstances that have to be taken into account when analyzing individual cases of people deviating from the ideal route. We shall examine these in detail in the following section with a view to implementing measures to improve the situation. To this end, the respective locations of the deviations were also photographed from the perspective of the target person.

The comments of the "shadowers" and of the photographer can also be used for a more in-depth analysis against the background of the signage concept.

3.4 Divergences From the Ideal Route Under the Signage Microscope – Assessment and Options for Improving the Signage

Using the photo documentation of the 17 locations of the first divergence from the ideal route, plus the observation comments recorded by the shadowers (see Table 4), the people responsible for the signage examined the extent to which extant or hitherto absent signage elements might have *contributed* to a decision to deviate from the route, and what measures might be considered to rectify this state of affairs.

We should emphasize in advance that individual decisions about which route to take are multicausal and that signage must be understood as a sequence of communication that is not always visible and already has an impact on an individual's path to the site of divergence. These influencing factors—such as one's use of the signage along the route—have already been discussed in section 3.3. The methodology chosen meant it was possible to categorize the 17 cases of deviation from the route by means of precise information about the location along with photos and the observations made by the shadowers. In 13 of the documented cases, the signage team reached the conclusion—based not least on the shadowers' comments—that introducing any new or altered signage elements on the spot would exert a comparatively minimal impact on the decision as to the route to be taken, and that it would be better to embark on the necessary improvements to the chain of communication (providing advance information and advising people to pay attention to the important signage elements along the route and at the entrance) and to general issues at the cemetery (such as avoiding more than one burial taking place at the same time). In the following four cases (each given here with a photo

45

and a map of the route taken), the weighing-up process nevertheless decided in favor of making improvements to signage on site.

With reference to the following divergence, one could consider adding the name of the reference sites to the back of the rectangular columns identifying them in the cemetery (e.g., the "Platz der Erinnerung," the "site of memory" case 1).
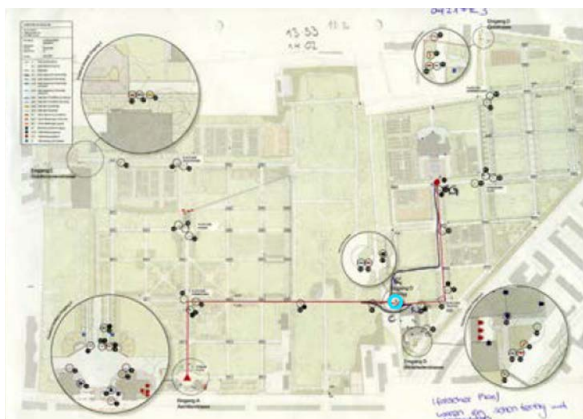
Image 3

Significant Contribution by Signage to Divergent Paths – Case 1
Photo: Nicole Hametner, IDR
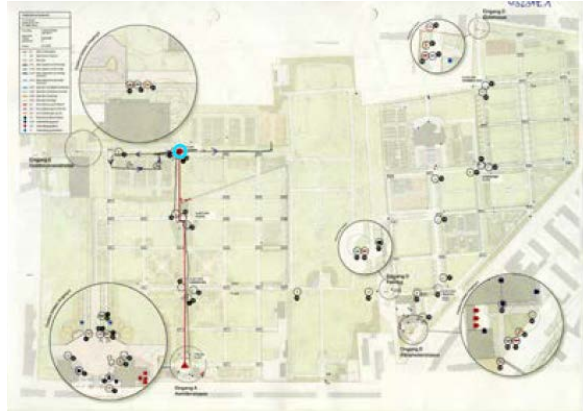
As to case 2, we may assume that the people in question did not see the main column with the overall map of the cemetery and the notice of the burials of the day. So, it would be worth considering also putting information on the back of the column for ease of orientation.

Image 4

Significant Contribution by Signage to Divergent Paths – Case 2
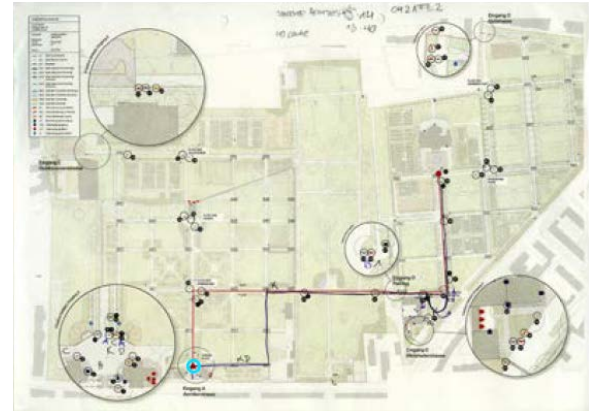*Photo: Nicole Hametner IDR*

In this third case, the observations of the shadowing person suggest it would be wise to consider offering the signs in at least two languages (German/English).

Image 5

Significant Contribution by Signage to Divergent Paths – Case 3
Photo: Nicole Hametner, IDR

In this fourth case, a further detailed analysis ought to consider whether people have relatively often failed to see this column, or whether this is an exceptional case. The photo offers a view through the archway; it is also a place that is perhaps one of the least clearly visible. The situation should be further assessed during an on-site visit. This is a particularly interesting case, as the shadowing method validated doubts discussed already, when the stele was installed: at the time monument protection for parks vetoed the placement of the stele in front of the arch, as initially planned by the signage team. The discussion is now reopened.

Image 6

Significant Contribution by Signage to Divergent Paths – Case 4
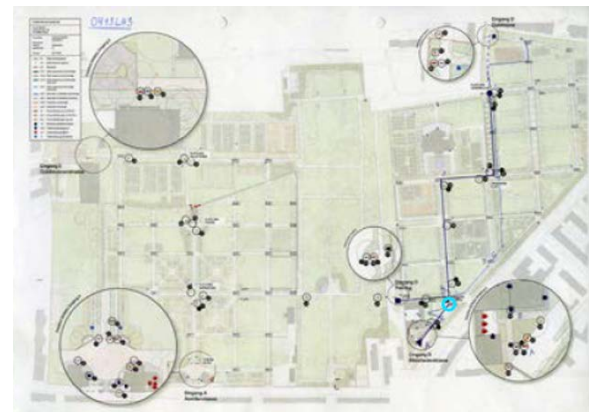
The point of departure for the evaluation presented here was the question as to whether the new signage system had largely solved the problem of mourners arriving late. Of the people shadowed, 27% ($n = 13$) arrived too late, though a late arrival at the cemetery itself was the decisive factor in two of those cases. It was also shown that late arrivals occurred more frequently among the 17 people who did not adhere to the ideal route. Our analysis subsequently concentrated on the signage-related factors and the general influencing factors linked to leaving the ideal route.

The degree of attention that people paid to the signage elements—at least as far as we can reliably observe their brief glances at them—leaves a lot to be desired overall. This applies in particular to the orientation boards and the notices at the entrances but also to the use of important signage elements along the ideal route. As far as the orientation boards are concerned, 44% ($n = 14$) of those who kept to the ideal route ignored them, while 65% ($n = 11$) of those who diverged from the route did the same. It was also observed that people paid relatively little attention to the signage elements along the ideal route. Even those elements categorized as "very important" were completely ignored by 41% ($n = 13$) of those who kept to the ideal route, and by 65% ($n = 11$) of those who diverged from it. Nevertheless, the differences between these two groups tend to indicate the signage had a positive effect. Our analysis of the exact location where the 17 divergent people left the ideal route also proved interesting, though "hotspots" at which several people left the route ought to be subject to special further investigation. By using the comments of the observers and photo documentation of the location from the perspective of the target persons, possible improvements to the signage on site have been determined by the authors of the signage concept, along with indications as to how the integrated communication chain might be further optimized.

As far as the general influencing factors are concerned, there was a slight increase in the use of wayfinding aids at the Platz des Trostes ("place of consolation"). *Signs of stress* (looking around as searching for something, appearing confused, etc.) were observed and localized among half (51%) of the shadowed people. Although it is evident

people had difficulty orienting themselves, the existing signage concept, which names different reference sites in the cemetery, makes it easier for people to determine where they are, something confirmed by the fact that those people who deviated from the ideal route were generally able to find their way back easily.

The vast majority ($n = 42$) chose the "correct" *ideal entrance*; only seven people chose the "sub-optimal" entrance that offers a longer route to their destination. Because two from this group deviated from the ideal route, this means that our original assumption is no longer plausible that having a longer route makes it more difficult for people to orient themselves. This result also indicates that the communication chain clearly works well when it comes to designating the entrance to be chosen.

Finally, it was shown that physical impairments (such as the need to wear spectacles) contribute disproportionately to people diverging from the ideal route, though these people pay greater attention to the signage when compared with people without any impairments. Once again, a site-specific investigation would have to be carried out to determine the extent to which visual impairments might have played a role in people diverging from the route at specific locations. The shadowing fieldwork also met with unusual challenges that highlighted further risks and limitations.

The Number and Selection of Funerals

Funerals were suitable for shadowing when the mourners had to gather at the grave and only afterward proceeded to the chapel or crematorium. But if the procedure was reversed, with the relatives of the deceased going first to the chapel or crematorium, then they naturally proceeded to the grave en masse afterwards, which meant that their group was unlikely to get lost.

Selection and Observation Of Target Persons

It often happened that relatives gathered at the entrances, or that the officiating priest received them there. This can be helpful for the mourners, but for us it resulted in fewer cases that we were able to observe than if the mourners had walked to the grave on their own. It was also not easy to distinguish who were mourners and who were visiting other graves or were just using the cemetery

to take a walk in nature. More specifically, observing from a distance implies that the observer sees the target person mostly from the back, making it difficult sometimes to follow the line of sight correctly. Also, in some cases, two burials took place at the same time in two different sectors, or a burial at a grave took place while a funeral service was being held in the chapel in the same sector at the same time. These overlaps were confusing not just for the mourners, but also for our observers when they were selecting a target person.

Logistics

The large scale of the Sihlfeld cemetery meant that one of our observers was following someone while the next person was already coming through the entrance. This meant we were not always able to observe all the mourners.

When evaluating the results we have presented here, it should be noted that we organized our study by extracting just one issue from a comprehensive catalogue of goals for the new signage system: namely, trying to solve the problem of mourners arriving too late. This naturally placed our focus on helping visitors to orient themselves better. The extent to which the other objectives of the signage system have been achieved can only be assessed through further, broad-based studies conducted in the future. The specifications for the Sihlfeld signage system "memorial landscapes" include the following: better links between the cemetery and public and private transport; conveying the feeling that visitors are welcome; providing clear, attractive information; taking current norms into account, and ensuring equality for people with physical impairments.

It should be noted here that the methodological approach of observation generates precise, location-based data on wayfinding in a way that surveys cannot. However, our approach can only *partially* take other general influencing factors into account. For example, we cannot determine the existing level of information possessed by the target people, nor whether or not they might already be familiar with the cemetery or have general wayfinding experience or skills from other contexts (such as going on hikes or negotiating railway stations). This is the only way we can explain why a subgroup is able to find their way successfully, despite paying little or no attention to the signage. Follow-up interviews to combine observation with self-report have been used in various situations (e.g., wayfinding at the airport; Gimpel, 2021). Yet, in the present context of cemeteries and funerals, it is not an option to ask people returning from the grave for an interview. Some additional information might be collected in future studies, interviewing the relatives to understand how they informed others about the funeral but not the people attending the funeral. A strategy for future research to solve this problem is to work with much larger samples of observation, assuming that in this case the unobserved background information variables are distributed randomly and the wayfinding performance can be assessed independently from these factors. Furthermore, understanding signage theoretically as a communication process would require a detailed exploration of the various stages of information starting with the registration office for funerals.

On the one hand, the relatively small number of observers meant we could not get statistically reliable results. On the other hand, the results presented here have been achieved and documented in detail for individual cases and with regard to location. This detail was made possible by the limited number of cases and by our qualitative method, which when seen in this light highlights the actual advantages of our approach. Our results have opened up opportunities for municipal cemetery managers to investigate specific individual issues *themselves* (e.g. regarding hotspots and the accumulation of observations; reviewing font sizes to suit those who wear spectacles; or analyzing "natural," alternative routes based on the route maps) and to initiate specific optimizations before transferring the model demonstrated in this pilot project to the other Zurich cemeteries.

REFERENCES

Bubric K, Harvey G, Pitamber T. A User-Centered Approach to Evaluating Wayfinding Systems in Health-care. HERD. 2021 Jan;14(1):19-30. Epub 2020 Sep 24. PMID: 32969270. DOI: http://dx.doi.org/10.1177/1937586720959074

Gimpel, H. (2021). Kunden umfassend kennenlernen – Erfahrungen einer shadowing-studie an einem internationalen Flughafen. *Wirtschaftsinformatik & Management*, 13(3), 222–229. • DOI: http://dx.doi.org/10.1365/s35764-021-00337-8

Gualandi R, Masella C, Viglione D, Tartaglini D. Exploring the hospital patient journey: What does the patient experience? PLoS One. 2019 Dec 5;14(12):e0224899. PMID: 31805061; PMCID: PMC6894823 DOI: http://dx.doi.org/10.1371/journal.pone.0224899

Hamad, Y. (2019). Shadowing: What is it? How to use it. Where will it go? *RELC Journal*, 50(3), 386–393. DOI: http://dx.doi.org/10.1177/0033688218771380

Interaction Design Foundation - IxDF. (2020, September 19). Shadowing in User Research - Do You See What They See?. Interaction Design Foundation - IxDF. https://www.interaction-design.org/literature/article/shadowing-in-user-research-do-you-see-what-they-see DOI: http://dx.doi.org/10.1002/hbe2.276/v1/review2

Johnson, Bart. (2014). Ethical issues in shadowing research, Qualitative Research in Organizations and Management 9(1) DOI: http://dx.doi.org/10.1108/QROM-09-2012-1099

Kevdzija, M., & Marquardt, G. (2022). Impact of distance on stroke inpatients' mobility in rehabilitation clinics: A shadowing study. *Journal of Planning Literature*, 37(2), 382–382. DOI: http://dx.doi.org/10.1080/09613218.2021.2001302

Lunger, C., & Scheiber, M. (2008). Orientierung auf Reisen: Touristische Leitsysteme. Berlin: DOM publishers.

McDonald, S. (2005). Studying actions in context. A qualitative shadowing method for organizational research. *Qualitative Research*, 5(4), 455–473. DOI: http://dx.doi.org/10.1177/1468794105056923

Mollerup, P. (2005). *Wayshowing: A guide to environmental signage, principles & practice*. Baden: Lars Müller Publications. DOI: http://dx.doi.org/10.1080/17493460600845543

Müller, K., & Straatmann, T. (2011). Qualitative Beobachtungsverfahren. In G. Naderer & E. Balzer (Eds.) *Qualitative marktforschung in Theorie und Praxis – Grundlagen – Methoden – Anwendungen* (pp. 313–344). Wiesbaden: Gabler Verlag-Springer. DOI: http://dx.doi.org/10.1007/978-3-8349-6790-9_16

Parke S, Dauda N, Ayarza R. Behaviour Insight Shadowing: examining daily life settings for the prevention of neglected tropical disease. Int Health. 2022 Sep 21;14(Suppl 2):ii25-ii32. DOI: http://dx.doi.org/10.1093/inthealth/ihac042

Possas, M. D., & Medeiros, R. D. (2017). In the shadow of Grupo Galpao: An experience of using shadowing to understand organizing." *Administracao-Ensino E Pesquisa, 18*(3), 624–654. https://raep.emnuvens.com.br/raep/article/view/544 DOI: http://dx.doi.org/10.13058/raep.2017.v18n3.544

Quinlan, E. (2008). Conspicuous invisibility shadowing as a data collection strategy. *Qualitative Inquiry, 14*(8), 1480–1499. DOI: http://dx.doi.org/10.1177/1077800408318318

Schmid, J. (2013). Signaletik – die zielführende Orientierung. In C. Schittich (ed.) *Erschließungsräume. Treppen, Rampen, Aufzüge. Wegeführung. Entwurfsgrundlagen* (pp. 40–47). Munich: Edition Detail. DOI: http://dx.doi.org/10.11129/detail.9783955531133.40

Tyldesley-Marshall, N., Greenfield, S., Neilson, S. J., Adamski, J., Beardsmore, S., English, M., & Peet, A. (2020). Exploring the role of "shadowing" as a beneficial preparatory step for sensitive qualitative research with children and young people with serious health conditions. *Societies, 10*(1), 14. DOI: http://dx.doi.org/10.3390/soc10010014

van der Weele, S., & Bredewold, F. (2021). Shadowing as a qualitative research method for intellectual disability research: Opportunities and challenges. *Journal of Intellectual & Developmental Disability, 46*(4), 340–350. DOI: http://dx.doi.org/10.3109/13668250.2021.1873752

Watzlawick, P., Beavin, J. H., & Jackson, D. D. (2016). *Menschliche Kkommunikation*. Hogrefe, vorm. Verlag Hans Huber.

Sihlfeld Cemetery - Zurich, Switzerland
Supplementary Maps and Photos to Accompany The Journey to the Grave

1

2
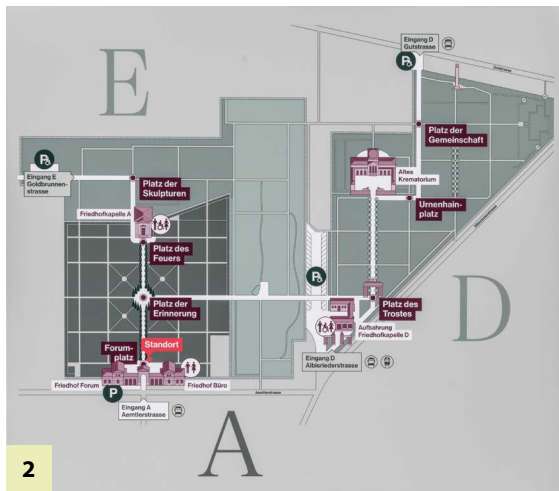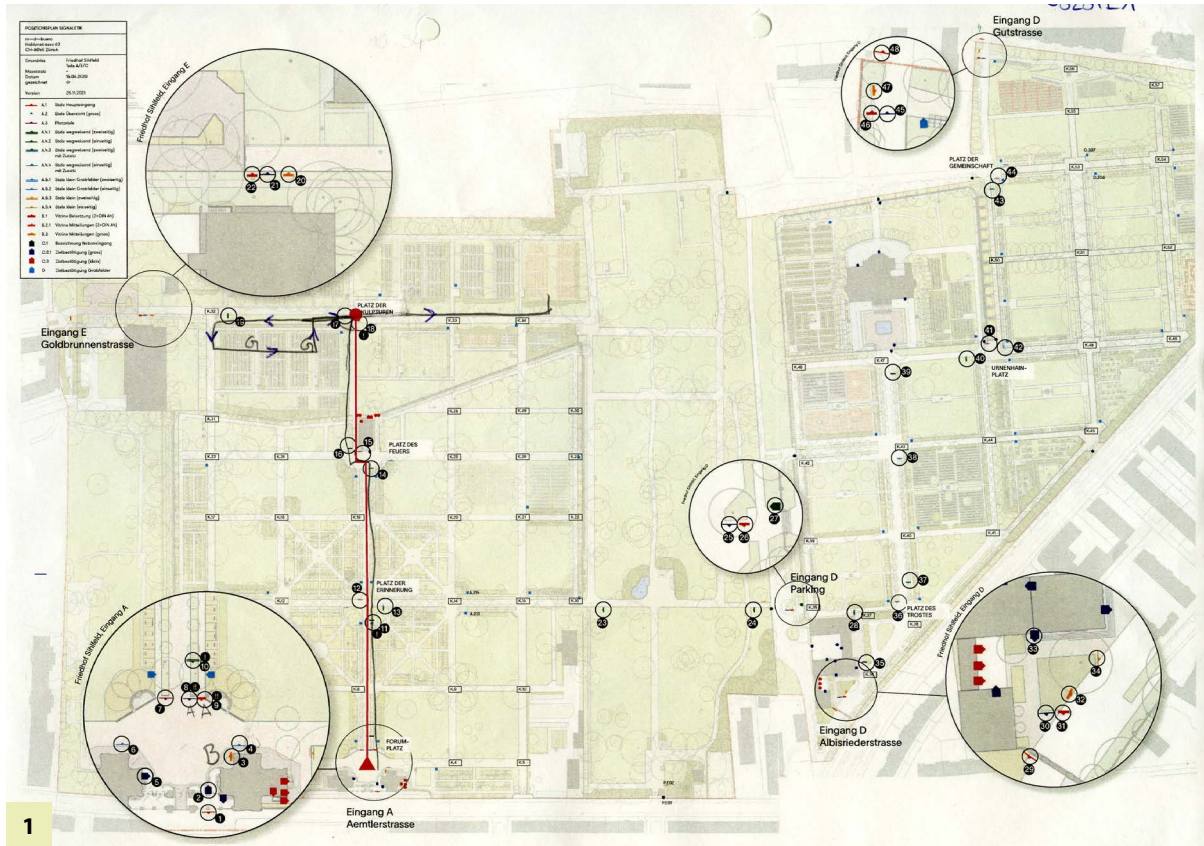
## MEMORY LANDSCAPES: SIGNAGE FOR ZURICH'S CEMETERY SYSTEM

The city of Zurich introcuded a new signage system with the concept "Memory Landscpaes." The system orients the visitor to major sites and landmarks (Plätze) within the cemetery and shows visitors the ideal path to reach their destination. The design system was conceived and implemented by m—d—buero design.

1. Signage program showing placement and type of signs. Red handwritten path shows ideal path in sector A. 2. Final orientation map showing the different sectors and iconic renderings of the major cemetery landmarks.

51

Entire Path of Target Person: Entrance A (Eingang A) to Place of Sculptures (Platz der Skulpturen)

## ENTRANCE A (EINGANG A) & FORUM PLACE (FORUMPLATZ)
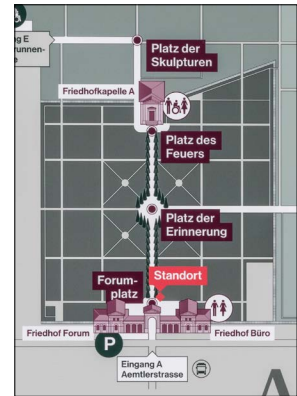
1. Signage at Entrance A before visitor enters cemetery. 2. Informational signage near the Forumplatz buildings. 3. Information board with general information. 4. Wayfinding signs at the edge of the Forumplatz. 5. Details of the wayfinding sign at the edge of Forumplatz showing the whole cemetery layout and information about ceremonies and burials. 6. Sign identifying location Forumplatz and showing more detail of the Forumplazt area. 7. View of Entrace A from within the cemetery and rear view of wayfinding signage in photo 5 and 6.

PLACE OF REMBRANCE (PLATZ DER ERINNERUNG)

1. Sign identifying the Platz der Erinnerung and showing more detail of the zone. 2-5. Signs at the major intersection of the Platz der Erinnerung showing directions to the major sectors of the cemetery.
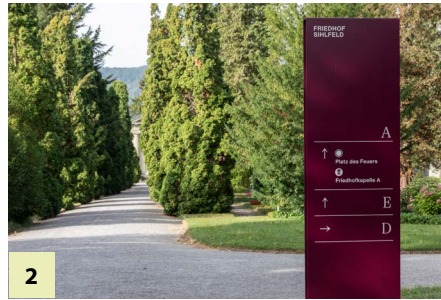
PLACE OF FIRE (PLATZ DES FEUERS)

1. Sign identifying the Platz des Feuers and showing more detail of the zone. 2. View from the Platz der Erinnerung towards Chapel A in Platz des Feuers. 3-4. Signs directing visitors towards the Platz der Skulpturen.

PLACE OF SCULPTURES (PLATZ DER SKULPTUREN)

1. Sign identifying the Platz der Skulpturen and showing more detail of the zone. 2. View from the Platz des Feuers towards Platz der Skulpturen. 3. Signage identifying numbered plots. 4. Markers in the Platz der Skulpturen. 5. Sign indicating an exit at the edge of sector E.

## PATHWAY CONNECTING SECTOR A AND D

1-3. Taking the path on the right of the Forumplatz towards sector D: around the bend and eventually intersecting with the path shown in 4-6.
4-6. Path connecting Platz der Erinnerung with the sector D parking lot.

Path from Entrance D (Eingang D) and Place of Consolation (Platz des Trostes) to Community Square (Platz der Gemeinschaft)

ENTRANCE D (EINGANG D ALBISRIEDERSTRASSE)
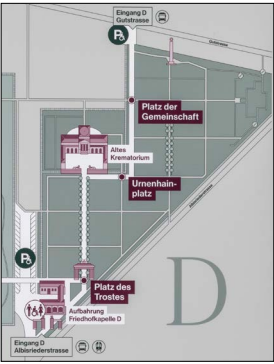
1. Entrance into sector D of the cemetery from Albisrieder-strasse. 2. Closeup of signage at the Entrance D gate.
3. Entrance D signage near Chapel D showing map of entire cemetery. 4. Information bulletin board at Entrance D.
5. View of Entrance D from within the cemetery. 6. Signage directing visitors towards different sectors of the cemetery.

PLACE OF CONSOLATION (PLATZ DES TROSTES)

1. Archway from Entrance D into Platz des Trostes. 2. Platz des Trostes looking towards the Old Crematorium in the Urnenhain-platz zone. 3. Detail of Platz des Trostes zone. The plot numbers shown in 3 evolved historically and cause confusion while navigating the cemetery. Therefore these numbers are not shown on the overview plan and are only shown on the plans of the squares.

## URN GROVE (URNENHAIN-PLATZ)

1. Detail of the Urn Grove (Urnenhain-platz zone. 2. Signage directoring visitors from the Urnenhain-platz zone towards numbered plots in the Community Square (Platz der Gemeinschaft). 3. The Old Crematorium which serves as a major landmark in the Urnenhain-platz zone. 4. Signage at the intersection between the Old Crematorium and Urn Grove. 5. View towards the Community Square from path between the Old Creamtorium and the Urn Grove. 6. Looking back towards the Old Crematorium with Urn Grove on the right.

## COMMUNITY SQUARE (PLATZ DER GEMEINSCHAFT)

1. Detail of wayfinding signage showing Community Square (Platz der Gemeinschaft) zone. Notice the change in orientation of the map. 2. Map and information board at the Entrance D Gutstrasse. 3-4. Community Square zone. 5. View from Urnenhain-platz zone looking towards the artwork in the center of the Community Square.
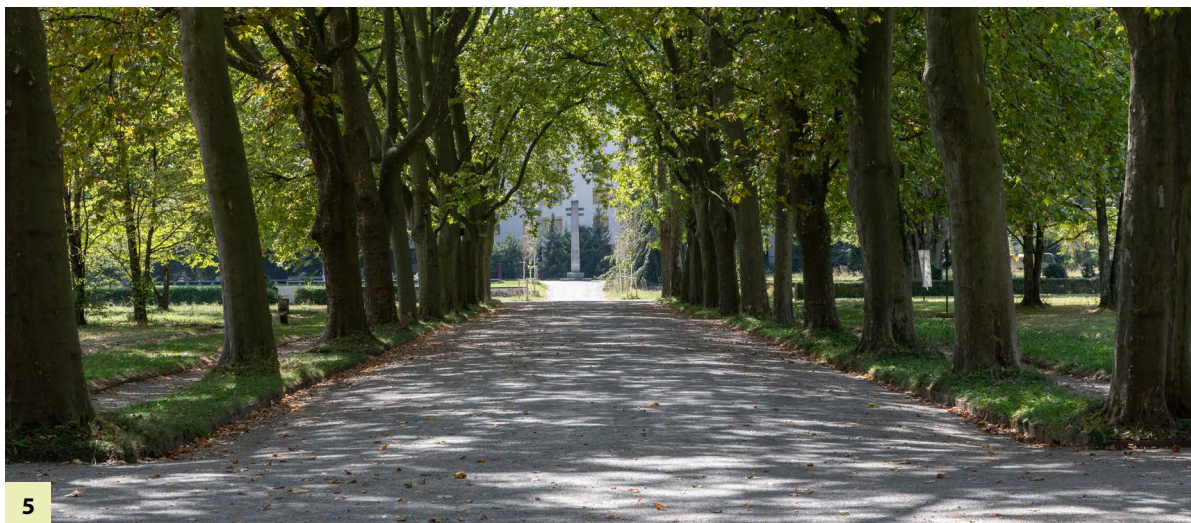
Additional Entrances and Photos from Sector D

ALTERNATE ENTRANCES FROM THE SECTOR D PARKING LOT
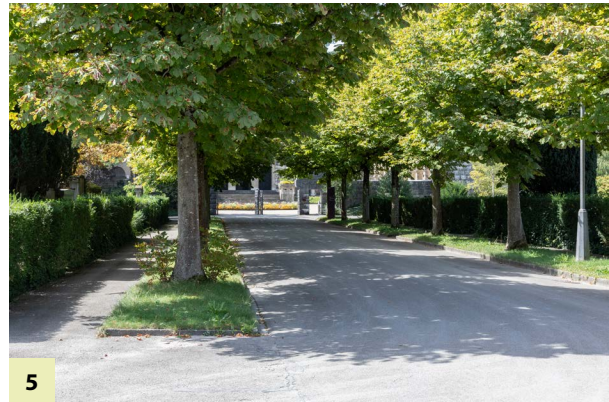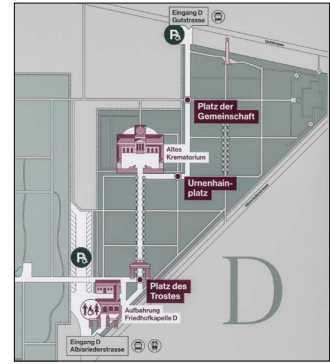
1-2. Entrance from Parking Lot D (Parking lot adjacent to Albisrieder-strasse entrance) looking towards the sector D chapel on the right.
3. View from Parking Lot D towards the side entrance to A and E sector.
4. Additional entrance from Parking Lot D into sector D leading to path connecting Platz des Trostes and Old Crematorium. 5. Looking left from side entrance towards Old Crematorium. 6. Signage at near the gate/entrance an the front of the Old Crematorium.

Exhibit Review

Give Me A Sign: The Language of Symbols at the Cooper Hewitt Museum in New York

Craig Berger

Chair
Communication Design
Pathways Department
Fashion Institute of Technology

craig_berger@fitnyc.edu

It is rare to see an exhibition focused on symbols, iconography, and visual language. While symbols are essential in almost every form of media from smartphones to brochures, they are particularly central to the world of spatial wayfinding, urban signs, and visitor information.

The exhibition *Give Me a Sign: The Language of Symbols* at the Cooper Hewitt Museum in New York running through August 1, 2024 provides visitors a fascinating history of how symbols are developed as a communication tool. While the exhibition has flaws in omission and completeness, the overall perspective is excellent and provides a glimpse into how symbols are used as a tool and, by extension, how symbols play a central role in visual communication.

The exhibition is built around the 50th Anniversary of the *Symbol Sourcebook*, a book joined with an exhibition by Henry Dreyfuss in 1972. Dreyfuss was an advocate for standardization and education of symbols as a shared international language. The book came out at a crucial time. International travel had boomed starting in the 1950s and with the arrival of the jet age people were traversing the globe with little ability to read signs, maps, and other navigational devices. The need for internationally understood symbols created an entire new field of design and research with authors like Romedi Passini and designers like Lance Wyman focused on how symbols can be best utilized in wayfinding, as well as designers like Massimo Vignelli seeking to rationalize transportation systems and maps.

While the exhibition is excellent and serves as a great introduction for designers and a general audience new to symbol and pictogram design, it misses a few marks crucial in making the exhibition more successful including highlighting the success of symbols as a language and the designers, associations, researchers, and advocates responsible for building a discipline around it. Also, an exploration of the difficulties and failures in development including political, cultural, and technological factors. The Cooper Hewitt Museum builds extensive educational programs around its exhibitions, so many of the items being introduced in this review may have been covered in later lectures and programs. This review will provide context for many of these additional topics as well as an extension of the topics covered in the exhibition.
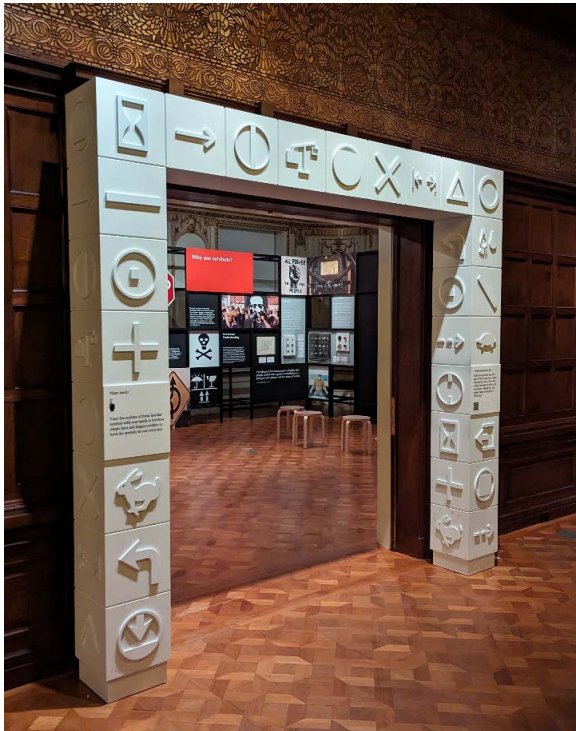
Figure 1 /

The exhibition impressively integrates graphics, illumination and modular systems in a historic building environment (All images by the author.)

IMPRESSIVE DESIGN

The most successful and impressive part of the exhibition is the design. Cooper Hewitt is renowned for its beautifully designed permanent and traveling shows, particularly when dealing with the difficult limitations of working in a historic museum space. The exhibition design by Studio Matthews utilized modular systems, freestanding landmarks, and custom fixtures as a support for simple and beautifully developed graphic elements. The exhibition has a few artifacts like the symbol sourcebook poster, which is given the recognition it deserves in the exhibition. The exhibition design stands out with the interactive activities table where visitors can design their own symbols. The structure fits the larger sensibility of the show, and its central position supports engagement. Subtle lighting is a highlight of the exhibition, building a sense of place with minimal interventions. The designers have also included additional playful interactives, including one that links body movement to Olympic symbols.

SUCCESS IN INTRODUCING THE IMPORTANCE OF SYMBOLS

Utilizing the Symbol Sourcebook as a catalyst for the exploration of symbols as language is an excellent decision as a foundation for the structure of the exhibition. The Symbol Sourcebook represented the first large-scale compilation of symbols from around the world along with an overview of semiotics. This allowed researchers and designers to see the similarities of symbols across countries and cultures. The visual artifacts incorporated in the exhibition are stunning. It clarifies the revolution this book created along with the achievement of accumulating and publishing this data in a pre-digital era. It also sets up the second major success in the exhibition; the adaptation of symbols as a consistent language and identity within the Olympics.

THE OLYMPICS AS A CODIFICATION OF SYMBOL DISCIPLINE

The other successful area of the exhibition is linked to the design of symbols for the Olympics. This is one area of the exhibition where the Symbols Sourcebook, the discipline of symbols design, and the actions of stakeholders meet. The exhibition properly highlighted the evolution of Olympic symbols and the culmination of that movement in 1968 by Eduardo Terrazas, Lance Wyman, and Beatrice TrueBlood (later refined in the sourcebook). These symbols have been the subject of multiple exhibitions in the past, most famously in Mexico City in 2018 for the 50th Anniversary of the games. Highlighting them in the exhibition is an excellent way of showing the importance of consistency and discipline to symbol effectiveness.

THE MISSING DISCIPLINE

The exhibition's height is with the Olympic Symbol development, but this is where the depth of the exhibition breaks down. Other major areas of the exhibition are dedicated to symbols adopted as part of political movements, the development of the accessibility symbol, and emoji development and adoption. The exploration of the adoption of the fist symbol is effective, but accessibility symbol development is a missed opportunity. The exhibition includes its development in 1968 as part of the

Scandinavian Student's Organization, and its adoption as an international symbol, integrated into national design guidelines around the world. The exhibition then makes a leap thirty years to the Accessible Icon Project's attempt at modifying the symbol. This update has received a great deal of press and is part of the Museum of Modern Art's permanent collection. What was not included in the exhibition was the controversy surrounding the adoption of the symbol by disability organizations, national, and local governments. The symbol was not adopted by the United States Federal Highway Administration or the US Access Board. Some local government bodies including the City of New York have adopted the symbol as an alternate but it is rarely used (Note: The author served on the Access Board ISO standards committee in the first year the symbols were discussed as a possible standard).

Including this controversy would have added another important layer to the exhibition. Symbols are an important part of the visual vocabulary of placemaking, and face an important regulatory buy-in, particulary in transit, healthcare or vehicular sign projects. This discussion could also be applied to current controversies including development of symbols to reflect gender neutrality or arguments over emojis used in video games like the recent controversy in South Korea. Even a small reference to these discussions would add an additional layer of depth to the adoption of symbols.

The other missed opportunity was in the areas of symbol design and refinement, which is perhaps the most successfully designed part of the exhibition. This impressive section of the exhibition is an interactive activity for the design of symbols with the chance of submitting the designed symbol to the sourcebook. This section could have been greatly enhanced by elements successfully displayed in the Olympics section, showing how the designed symbol elements could be better refined into a language.

FROM INCEPTION TO REFINEMENT TO ADOPTION

The Symbol Sourcebook launched a revolution in symbol design, advocacy, and advancement that created an enormous leap in the development of visual language not often seen in our schools and design firms today.

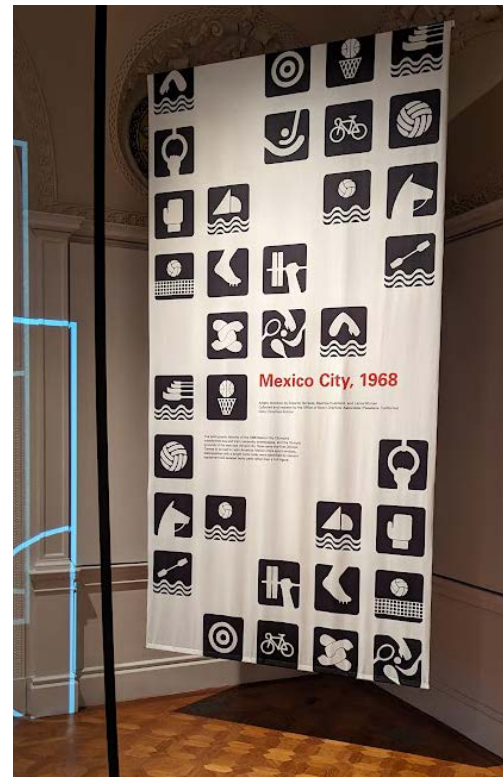
Figure 2 /

The Sourcebook

Figure 3 /

The Olympic Symbols are a High Point in the Exhibition for Profiling the Refinement of Symbols

Highlighting this ecosystem of research, design, and advocacy would provide the exhibition with a more lasting impact. It would also potentially answer a question that many exhibition viewers may ask. Is the heyday of symbol design and development behind us?

This question could be answered with small additions profiling the development of symbols the Sourcebook inspired. Design and advocacy could include the groundbreaking work by Tom Geismar with AIGA to develop and implement Airport Symbols, most of which are adopted by airports around the world today. The work promoted by the Society for Experiential Graphic Design (SEGD) with designers like the late Jack Biezeck for the development of healthcare symbols (Note: Craig Berger was the project lead for the Hablamos Junto healthcare symbols project) and Meeker and Associates led Recreation symbols for the Army Corp of Engineers. These projects illustrate how symbols are developed and adopted.

Finally, a more in-depth exploration of refinement based on the work of the Symbols Sourcebook should include the work of Mies Hora whose Official Signs and Icons has continued the refinement efforts by turning thousands of symbols into consistent and usable systems. For digital, the work of Shigetaka Kurita is a must to show the first refinements of emojis for digital use during a period when phones and screens were very primitive.

Figure 4 /

The excellent interactive symbols design exercise at the center of the exhibition could also serve as a foundation for semiotic research.

Research in semiotics and symbols cognition would also be an important element to add considering its importance to the development of symbols as a visual language. The exhibition designers developed a wonderful exercise, asking visitors to recognize lesser-known symbols, but this could have been an opportunity to expand the field of symbol recognition research. This is an expansive topic and would be worthy of its own exhibition, but more context would have been helpful.

None of these critiques should serve to minimize the success of the small but highly educational exhibition. The museum has a difficult task in trying to engage the public in conceptual design ideas and their impact on society. The exhibition provides a glimpse of the potential to expand designer vision.