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Evaluating Library Signage: A Systematic Method for Conducting a Library Signage Inventory

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Abstract

While there is much literature that directs libraries to avoid having too much or insufficient signage, there is no clear guidance on how much signage is “enough” or “too much.” Conducting a signage inventory can be the first step toward determining how many signs a library needs, by establishing how many signs are in the library, of which type, and their condition. This paper proposes a ready-to-use method that any library can use to inventory its signage by adapting the inventory worksheet depending on factors related to the library type. The ultimate goal in developing a standardized method is that it would allow for, comparing results across libraries to attempt development of more specific signage guidelines or a formula that could calculate how many signs are “enough” and “too many” for a library given its type, population, and other criteria.

Keywords

signage, evaluation, wayfinding

Introduction

Many authors reporting post-occupancy evaluations recommend avoiding “too much” or “excessive” signage because these overload wayfinders (Arthur and Passini, 1992; Eaton, 1991; Eaton et al., 1993; Marks and Findley, 2006; Rosenbaum, 2010; Serfass, 2012), yet none specifically define how much is too much. Others talk about not having enough signage (Baker et al., 2015; Palmer, 2008), but no one indicates how much is enough. How much signage is “enough” or “too much?” The first step in determining how many signs a library needs is to inventory the library’s signage to see how many signs are in the library, of which type, and in what condition.

Methods for inventorying signage can vary across libraries. The intention of this paper is to provide a ready-to-use method that any library can adopt. The purpose of this is two-fold: 1) there is no reason why each library should “reinvent the wheel” when it comes to inventorying its signage and 2) if libraries began to adopt this method, it would be possible to compare results across libraries and then develop more specific signage guidelines that indicate how many signs are “enough” and “too many” for a library given its type (i.e., academic, public, school), population, and other criteria.

Problem statement

In public spaces, people can find their way or get lost/disoriented (Gibson, 2009). Generally signage helps people find their ways but it cannot compensate for overly complex or overly large and complex facilities (Dogu and Erkip, 2000), which seems to be the case in libraries, where researchers have identified that the majority of questions users have are directional (e.g. Bishop and Bartlett, 2013; Brandon, 2002; Luo and Weak, 2011). If the user-friendly library is one that “anticipates and reacts to users’ needs for easy and convenient access to the library’s collections, resources, and services” (Bosman and Rusinek, 1997, p. 72) or “delivers patrons with minimal effort and intervention to the materials they want” (Dempsey, 2006, p. 14), then it is one where the signage instructs users, reduces anxiety, mitigates negative experiences, and maximizes the user-friendliness of the environment.

This ideal user-friendly library matches Beecher’s identification that patrons expect wayfinding tools to exist, contain information, and be accurate and legible, but she notes that these expectations are often unmet (2004). Others have noted similar discrepancies between the ideal and the real. Baker et al. (2015) say that despite efforts by the library to increase usability of the facility, informal observation shows patrons are often confused when trying to locate specific areas of the facility. Eaton et al. speak of students feeling lost and anxious (1993) and Andrews and Eade explain that “any shortfalls in library layout or in directional signage have the potential to increase library anxiety” (2013, p. 164).

Even in libraries with effective signage, it is not a cure-all. Signage cannot overcome fundamental architectural confusion, complexity, and inaccessibility (Arthur and Passini, 1992). Even in an area with high visibility and connectivity and low layout complexity (i.e., a fairly ideal environment to support wayfinding), inconsistent signage still causes location errors (Li and Klippel, 2012). There is also a danger of relying on signage as the only guide for users’ wayfinding in libraries since patrons have been known to move aside a sign and ask staff a question that would be answered by the sign they just moved (Polger and Stempler, 2014). It is critical for libraries to do everything they can to provide an effective wayfinding information system since “poor judgment of wayfinding in the setting affects the way the organization itself is perceived” (Passini, 2002, p. 96). Passini (2002) identifies three questions to answer when developing a graphic support system: (1) what information needs to be provided, (2) where should that information be, and (3) in which form should the information be presented. Question three about the “form” of the information suggests that signs might be print, digital, or a combination of both. Although the literature says to be consistent and clear, the suggestions for how to do so are vague (Polger and Stempler, 2014).

Redesigning a library is often impractical, whereas reviewing and overhauling the signage is within reach. So it bears asking, how do we assess signage in libraries, and how do we design more effective signage for library users? This paper attempts to address these issues through the explanation and demonstration of a successful method for assessing signage in libraries.

Literature review

The researchers first conducted an extensive review of the related literature in order to understand the issue, examine the prior research in this area, and utilize it as a foundation for their research.

Signage assessment methods

Preiser (1995) argues that post-occupancy evaluation (POE) is a valuable tool for universities and other large institutions with ongoing building programs because it allows the

organization to gain user feedback on problems and identification of solutions, use positive and negative lessons in the next building design, and create databases and criteria to ultimately improve facility quality and worker morale and save money. One component of POE is assessment of a facility's signage, and this is an aspect of POE that is of clear concern for libraries (Lubans and Kushner, 1979; Schoonover and Kinsley, 2014; Stempler and Polger, 2013). Schoonover and Kinsley explain this importance as a way to facilitate access to library services and collections (2014).

“Research has found that signs may be more effective when there are fewer of them—the more signs a person sees, the less likely he or she will be to read the relevant one,” but “For every frequent question, librarians place a sign, hoping to eliminate the monotonous burden of answering it” (Eaton et al., 1993, p. 82). This is strong support for Stempler and Polger's suggestions to get staff buy-in before assessing and redesigning signage (2013).

A variety of methods have been used to assess the level of wayfinding ease in libraries, including surveys, experiments, and observation, as well as inventories/audits of signage. Some researchers conduct surveys to gather patron perceptions of signage in addition to other methods of assessment, such as to supplement a signage audit (Eaton et al., 1993) and in conjunction with observation (Schoonover and Kinsley, 2014).

Experiments seem to be more popular than surveys as a method for assessing library wayfinding (Andrews and Eade, 2013; Baker et al., 2015; Beecher, 2004; Hahn and Zitron, 2011). Most of these experiments involve recruiting patrons, often first-year students, and giving them tasks to complete while they are timed, audio recorded, and/or observed, but another possibility is conducting journey mapping (Andrews and Eade, 2013). In journey mapping, participants are given scenarios to enact while researchers observed them and noted steps they took within their journeys: interactions with staff, interactions with library systems, emotions expressed, problems encountered, and suggestions for improvement. Another method is to conduct a space syntax analysis to measure the building's architectural legibility and layout complexity and use this data in comparison to data gathered through observation of patron wayfinding behavior in the facility (Li and Klippel, 2012).

Inventorying or auditing the signage is growing in popularity, with studies largely conducted in academic libraries (Eaton et al., 1993; Polger and Stempler, 2014; Stempler and Polger, 2013) but some in public (Mandel, 2013) and school (Johnston and Mandel, 2014) libraries. Brown suggests that in an existing facility, staff should first assess existing signs, then develop a list of signs and their locations, possibly with supporting photos, and study the list to determine which signs to eliminate or replace and where additional signs are needed (2002). Bosman and Rusinek say to inventory all signs, noting their size, shape, color, format, type size, installation method, message, and purpose by physical location, including photographs (1997). In addition, Stempler and Polger suggest classifying signs as policy, informational, or directional and permanent (created and installed by professionals) or temporary “produced in-house and mounted provisionally” (2013, p. 122).

Wayfinding information systems in libraries

Through experiments, researchers have found that patrons struggle with library classification and stack organization (Baker et al., 2015; Beecher, 2004; Hahn and Zitron, 2011), they use signs and ask staff for help (Hahn and Zitron, 2011) but sometimes find signs to be missing or unhelpful (Andrews and Eade, 2013; Beecher, 2004). They also require assistance with orienting themselves sometimes asking for help or seeking “you are here” maps (Baker et al., 2015) and other times browsing an entire floor to find a specific location or item (Beecher,

2004). Also, when they struggle to locate and retrieve materials, they feel increasing confusion, frustration, and lostness (Beecher, 2004). Signage inventories have found poor placement, visibility, and clarity (Eaton et al., 1993); inconsistency in style (Stempler and Polger, 2013); overuse of library jargon (Eaton et al., 1993); negative messages (Stempler and Polger, 2013); and handwritten signs (Eaton et al., 1993; Stempler and Polger, 2013). Schoonover and Kinsley (2014) found that while students were using directories to locate library areas and materials, the majority preferred speaking to a person for assistance and most used a combination of methods to wayfind.

The literature provides a number of key issues to consider in designing signage. First and foremost, view signage as a system (Brown, 2002; Larsen and Tatarka, 2008; Selfridge, 1979). Then there is the question of how many is too many, with most advice saying to have neither too many nor too few (Arthur and Passini, 1992; Brandon, 2002; Brown, 2002; Marks and Findley, 2006; Palmer, 2008; Polger and Stempler, 2014; White, 2010). Where signs are placed matters; signs need to be short, clear, and installed where people need them (Andrews and Eade, 2013; Arthur and Passini, 1992; Baker et al., 2015; Beck, 1996; Beecher, 2004; Brandon, 2002; Eaton et al., 1993; Gibson, 2009; Larsen and Tatarka, 2008; Lushington and Kusack, 1991; Passini, 2002). Signs need to be visible, simple, and legible (Arthur and Passini, 1992; Dempsey, 2006; Lushington and Kusack, 1991; Rutledge, 2002; White, 2010). Consistency is key, both in use of terminology and design (Arthur and Passini, 1992; Baker et al., 2015; Beecher, 2004; Brandon, 2002; Brown, 2002; Dempsey, 2006; Hahn and Zitron, 2011; Larsen and Tatarka, 2008; Lushington and Kusack, 1991). When collections and services are relocated, signs also need to be relocated in order to remain current (Brandon, 2002; Palmer, 2008; Polger and Stempler, 2014). Signs are for patrons so library jargon needs to be avoided (Baker et al., 2015; Beecher, 2004; Brown, 2002; Dempsey, 2006; Larsen and Tatarka, 2008; Palmer, 2008). Avoid ad hoc signs (Byam, 1979; Eaton et al., 1993; White, 2010), especially handwritten signs, “perhaps the most egregious of all types of signs to avoid” (Stempler and Polger, 2013, p. 129). And use positive language, even when telling patrons what not to do (White, 2010).

Description of signage inventory method

The researchers have developed and field tested a method for conducting an expert signage inventory, utilizing a standardized coding worksheet and photographs of exemplar signs to illustrate signage issues and good signs. To begin to test the method, the researchers utilized it in three different applications, including a public library (Mandel, 2012), school libraries (Johnston and Mandel, 2014; Mandel and Johnston, 2014), and an academic library (Mandel, 2015). While some adaptation of the worksheet is necessary for each library type, the worksheet was effective as a tool for assessing the signage in each library type.

Most libraries have a plethora of signs, far more than they might anticipate before conducting a signage inventory. In order to inventory all signs, whether print or digital, in a systematic way, it is necessary to use a standardized coding worksheet throughout the inventory. However, such a worksheet was not available for the first iteration of this research, and the researcher developed a worksheet around signage categories derived from the literature, such as direction, regulator, and informational. The worksheet discussed here was first developed in 2010 as a data collection workbook in Microsoft Excel that was printed so the researcher could carry a clipboard through the library, with the sheets on it. The worksheet has a row for each sign’s name (ascribed by the researcher(s) based on the text and purpose of the sign) and then the following columns:

- *Floor or School*: Floor was used in multi-level facilities (the public and academic libraries), and in the audit of signage in multiple school libraries all of which were one floor, this section was replaced with “school” for simplicity in using the same worksheet for all three schools.
- *Category*: This is based on three main categories of signage developed by Arthur and Passini (1992) – *Directional* (specifying arrows or text), *Regulatory* (library or other), and *Informational*. Because directions are what library users most often expect from signage, any signs that meet the definition of directional are coded as directional signs, even if they also pertain to regulations. All signs that are not directional or regulatory are informational signs.
- *Location*: Physical location of the sign, so this might be *Table*, *Stack End*, etc.
- *Language or Lang Level Appropriate*, depending on the library): For libraries serving bilingual or multilingual communities, this is important to note, and for school libraries, age appropriateness of language is assessed in this section.
- *Issues*: Classification of issues has developed over time from damaged, out-of-date, incorrect language in the first iteration to the following categories – *Not Clear*, *Wrong Location*, *Not Current*, *Obscured*, *Damaged*, *Ad Hoc*, and *Other*, some with subcategories depending on the library.

Iteration 1: The public library

The first iteration of the worksheet (see Fig. 1) was used in a public library as part of a larger case study on wayfinding in a public library facility (Mandel, 2012). Because the researcher was observing wayfinders during three sample weeks, the signage in the library was also inventoried three times, in fall, summer, and spring (weeks had been purposively sampled with input from library staff to determine the weeks they felt were most representative of summer, fall, and spring activity). This project was a dissertation, and as such, the inventory was conducted by one expert reviewer. All signage was reviewed in each of the three weeks because reviewing all the signage in the library is necessary for an effective signage audit (Stempler and Polger, 2013). The researcher took photographs of signs that illustrated good use of signage and examples of signage issues (as identified during the inventories) during the three inventories, maintaining a log of all photographs taken in order, with descriptions of the photo and why it was taken (Mandel, 2012). No digital signage was observed. The signage inventory was part of a document review that served as background for the case study so it was not subject to intra- or inter-coder reliability testing; the data gathered for the document review were analyzed thematically and codes for signage issues emerged (see Table 1).

SIGN NAME	CAT	TYPE	FLR	AREA	LCTN	LANGUAGE	No.	NOTES

Figure 1. Signage worksheet, iteration 1 (used in the public library).

Table 1. Signage worksheet codes and definitions, iteration 1 (public library).

Main Category	Subcategory	Definition
Sign Name		Name of the sign derived from text on the sign
CAT	D	Directional (includes all signs with arrows, maps, or use of directional terminology such as here, aqui, and exit)
	R	Regulatory (all signs pertaining to regulations, either library policies or otherwise, such as fire-related signs - that do NOT have arrows or directional language)
	I	Informational (all signs that are not Directional or Regulatory)
TYPE	Large area	Larger type size sign identifying area of the library (informational)
	Small area	Smaller type size sign identifying area of the library (informational)
	DDC (Stacks)	Dewey Decimal Classification signs in stack areas (informational) - note that < indicates a caret on the sign, <-- indicates an arrow on the sign, and Δ indicates a closed caret/triangle on the sign
	Subject terms (Stacks)	Subject terminology signs in stack areas (informational) and may be - hanging, - in holder, - on back of wall, - stuck on top, or - stuck on shelf
	Images (Stacks)	Pictures of subjects areas in stack areas (informational)

	Images (Other)	Pictures of other things, not subject areas (informational)
	Periodical titles	Signs indicating titles of periodicals below flip-up shelves (informational)
	Art	All artworks hanging in the library (informational)
	Computers	All signs pertaining to computers (informational) - NOT including computer use signs which are Regulatory
	Instructional	All signs that provide directions for how to accomplish a task or tasks, such as printing, copying, etc. (informational)
	Programming	Signs advertising programs/events (informational)
	Display	Signs or other items on display such as books (informational)
	Arrows	All signs with arrows (directional)
	Maps	All maps (directional)
	Text	All directional signs with text but NO arrows or maps
	Fire	All signs pertaining to fire, such as fire exits, fire extinguishers, etc. (regulatory)
	Emergency	All signs pertaining to emergencies, such as emergency exits etc. (regulatory)
	Elevator	All signs, around and pertaining to the elevator (regulatory)
	Parking	All signs pertaining to parking, mostly located in parking lot (regulatory)
	Library policies	All signs related to library policies, such as no cell phone use, lists of policies, Internet policies, etc. (regulatory)
FLR	1	First floor
	2	Second floor
AREA	NA	Elevator
	ELEV	Elevator
	E DR	East door
	Outside	Building exterior or parking lot
	W DR	West door
	NFIC	Nonfiction
	1 W	West side of library, first floor
	2 W	West side of library, second floor
	CR	Children's room
	REF	Reference department
	CTR	Upstairs center section
	SW	Southwest corner of library
	C	Circulation area
	SE	Southeast corner of library
	OCF	Area outside library offices
	CL	Computer lab
	RCL	Reference area computer lab

	REL	Reference area, e-government computer lab
	RD	Reference desk
	ELEV	Elevator
	ESP	Spanish language section (second floor)
LCTN	T	On a table (numbered)
	S	On a stack (numbered)
	D	On a door (numbered)
	W	On a wall (numbered)
	BBD	On a bulletin board (numbered)
	K	On the kiosk
	STR	On the stairs
	C	Hanging from ceiling
LANGUAGE	E	English language sign
	S	Spanish language sign
	B	Bilingual sign
	NA	Numerical signs, art, etc. with no text
No.		Total number of signs meeting the description in the specific location
Notes		Anything else about the sign that is noteworthy, such as color use, fading, currency (or lack of), inappropriate location, etc.

The last column, *Notes*, ended up covering specifics of issues with signs. The issues that emerged during thematic coding of the data were signs with no clear purpose, inappropriate location, not current, damaged, damaged holder, view blocked, wrong language, time sensitive including both only appeared when relevant and appeared when inappropriate, directionality incorrect, misspelling, empty (holder), specific style for audience – appropriate (primarily related to children’s signage), and poor legibility.

During this first iteration, the researcher was simultaneously conducting observations of wayfinders in the facility and already had maps that had all the areas and locations labeled, with each location numbered. For a library that is conducting only an inventory, such detail is most likely unnecessary, and this detailed level of denoting locations by numbered tables, stacks, etc. was dropped in the second iteration. Instead, the location column was expanded to include specific locations that, like the issues, could be checked off quickly.

Iteration 2: Three school libraries

After the first use of the worksheet in a public library (2010-2011), the first researcher teamed up with a second expert reviewer to test the worksheet and inventory method in school libraries (2013). Both experts reviewed all signage in a convenience sample of school libraries, using an adapted version of the worksheet that streamlined the inventory process by detailing the *Category*, *Issues*, and *Location* sections of the worksheet so that the researchers could check off boxes rather than detail each element in the notes. The second iteration worksheet also included a change from the category *Language* used in a library serving bilingual patrons, to the category *Lang Level Appropriate* for school libraries, with subcategories of yes and no (see Fig. 2) and a shift from *Floor* in the multi-level public library to *School* to indicate which school library’s signage was being inventoried, since all the school libraries were on one floor.

SIGN NAME	School			CATEGORY			LOCATION					LANG LEVEL APPROP		ISSUES				NOTES			
	E	M	H	Directional →	Text Lib	Regulatory Other	Info	table	stack end	shelf	wall	other	yes	no	not clear	wrong locn	not current		damage sign holder	other (specify)	

Figure 2. Signage worksheet, iteration 2 (school libraries).

This revised worksheet proved a far more efficient tool as the experts were able to inventory signs far more quickly with the added check boxes, and far fewer notes had to be specified. The two experts independently reviewed all signage in each school library using the coding scheme detailed in Table 2, taking photographs of signs that illustrated good use of signage to guide children’s wayfinding and others that illustrated issues, again keeping a log of photographs taken in order, with descriptions of items photographed and reasons for photographing the items. No digital signage was observed.

Table 2. Signage worksheet codes and definitions, iteration 2 (school libraries).

Main Category	Subcategory	Definition
Sign Name		Name of the sign derived from text on the sign
School	E	Elementary school
	M	Middle school
	H	High school
Category	Directional →	Signs that indicate direction by use of arrows
	Directional Tx	Signs that indicate direction by use of text
	Reg – L	Signs that indicate library rules
	Reg – O	Signs that indicate non-library rules
	Inf	All other signs
Location	Table	Sign on a table or desk
	Stack end	Sign on the end of a bookstack
	Shelf	Sign on a shelf
	Wall	Sign on a wall
	Other (specify)	Sign in another location, such as on a computer monitor
Age Approp	Yes	Sign is in language level appropriate to school level

Issues	No	Sign is not in language level appropriate to school level
	Not clear	Sign that is not clear but not because it is too small, has too much text, or has text that is too small
	Wrng loctn	Sign that is not where it belongs
	Placement	Sign is placed poorly, for example crookedly
	Not current	Sign that is outdated
	Damage – sign	Sign that is damaged
	Damage – holder	Sign holder that is damaged
	Poor color	Sign uses color that is hard to read such as yellow text on white background
Notes	Other (specify)	Any other issue
		Any comments or elaboration necessary

Since there were two coders in this iteration of the signage inventory method, it was possible to conduct inter-coder reliability testing. The two experts first discussed the discrepancy in the total number of signs each had coded, engaging in negotiation and ultimately agreeing to use the total generated by the reviewer with more experience with the method (n=432). Then, percent agreement was calculated for a sample of 10% of the total coded signs by totaling the number of agreements and dividing that by the total number of times a decision was made by the coders (Neuendorf, 2002), with overall percent agreement on all analyses of the sample signs equaling 82.6%, which is considered an acceptable level of agreement. After ascertaining that an acceptable level of reliability had been achieved, the researchers utilized descriptive statistics to compare the total signs in various categories.

Iteration 3: The academic library

Subsequent to using the inventory worksheet and method in the school libraries, the first researcher adapted the worksheet again for use in an academic library in 2015. The signage inventory for the academic library was conducted as an expert review (as had been done in iterations 1 and 2), this time during break weeks in January and March 2015. Break weeks were selected to minimize the effect of the inventory on patrons and to minimize possible distractions library patrons might cause during the inventory. Adaptations from the previous iteration included switching back to *Floor* from *Library* and removing the category *Lang Level Appropriate*, which was appropriate for school libraries but not an academic library (see Fig. 3). The expert independently reviewed all signage in public areas of the library, following the method to take photographs of signs illustrating good use of signage and issues with signage and to log all photographs. Again, no digital signage was observed.

SIGN NAME	Floor				CATEGORY					LOCATION						ISSUES					NOTES				
	B	1	2	3	→	Tx	L	O	Inf	table	stack end	shelf	wall	hang	other (specify)	not clr	wrng loctn	not curr	damage sign	hidr		other (specify)			

Figure 3. Signage worksheet, iteration 3 (academic library).

After completion of the inventory, the expert reviewer entered all data into an Excel spreadsheet beginning with the categories from the worksheet. As had happened in past uses of this worksheet, new categories emerged during the coding process. This happens because the worksheet uses some general categories, like *Issue – Not Clear*, and upon coding, specific categories of not clear signs emerged. Three new categories emerged from *Location – Other* during the coding and three subcategories of *Issue – Not Clear* emerged. Table 3 provides definitions for all codes in the worksheet in this iteration.

Table 3. Signage worksheet codes and definitions, iteration 3 (academic library).

Main Category	Subcategory	Definition
Sign Name		Name of the sign derived from text on the sign
Floor	B	Lower level
	1	First level
	2	Second level
	3	Third level
	4	Fourth level
	Stairs	Public staircase, interior
	Elev	Public elevators (2), interiors
Category	Directional →	Signs that indicate direction by use of arrows
	Directional Tx	Signs that indicate direction by use of text
	Reg – L	Signs that indicate library rules
	Reg – O	Signs that indicate non-library rules
	Inf	All other signs
Location	Table	Sign on a table or desk

	Stack end	Sign on the end of a bookstack
	Shelf	Sign on a shelf
	Wall	Sign on a wall
	Hang	Sign hanging from the ceiling or other location
	Door	Sign on a door
	Col	Sign on a column
	Wind	Sign on a window
	Other (specify)	Sign in another location, such as a cabinet
Issues	Not clear – not clr	Sign that is not clear but not because it is too small, has too much text, or has text that is too small
	Not clear – too sm	Sign that is not clear because it is too small
	Not clear – too much	Sign that is not clear because it has too much text
	Not clear – sm txt	Sign that is not clear because it has text that is too small
	Wrng loctn	Sign that is not where it belongs
	Not curr	Sign that is outdated
	Obscured – sign	Sign that is visually blocked
	Obscured – s & hold	Sign and holder than are visually blocked
	Damage – sign	Sign that is damaged
	Damage – hldr	Sign holder that is damaged
	Ad hoc – prt	Printed sign created in the moment and not as part of a system
	Ad hoc – hand	Handwritten sign created in the moment or a sign corrected by hand
	Font mismtch	Sign in a different font from other signs of the same type
	Sign spine mismtch	Sign in a specific section of the stacks (Serials and Reference) where the spine labels indicate the section but the signs do not
	Other (specify)	Any other issue
Notes		Any comments or elaboration necessary

Findings across the three iterations

In each of the different applications of the method, it was found that this method for assessing the signage in libraries provided a way to efficiently determine the number of signs present, categorize those signs according to Arthur and Passini's (1992) types of signs, identify location, and specifically note any issues with the signs. These researchers are comfortable using printed worksheets and clipboards, but for libraries with access to tablets, they could be used to further simplify the process since data could be entered directly into the spreadsheet at the time of data collection. This iterative use of the developing methodology presented opportunities to apply, test, and refine the method. By using the worksheet with adaptations across three library types, the researchers found some commonalities, such as a dearth of directional signs and an extreme prevalence of informational signs (also noted by Stempler and Polger, 2013), abundance of signs, and common issues with signs.

In the public, school, and academic libraries used in this research, informational signs comprised over 75% of signs in all library types. Informational signs comprised 91.3% of signs

in the academic library, 75.6% in the public library, and 83.0% in the school libraries. In contrast, directional signs only comprised 3.9% of signs in the academic library, 12.7% in the public library, and 2.3% in the school libraries. Regulatory signs are often mandated by fire codes and other laws, but even with the addition of library policy signs, these comprise only 4.8% of signs in the academic library, 11.7% in the public library, and 14.7% in the school libraries. The major issue seems to be a heavy reliance on information signs over directional signs.

An abundance of signs was found in both the public and academic libraries. In the public library, an average of 1366.3 signs was observed across the three observation periods. That study also employed a wayfinding and signage expert to review the validity of findings, who considered this a large number given the size of the facility, and interviews with library users, who said there were too many signs in the Library, turning the signs into “white noise” they ignored while wayfinding in the facility (Mandel, 2012). The academic library had over 6000 signs, and many instances of multiple signs clustered together. Most stacks were found to display 8-10 signs, sometimes more, with five or more signs displayed on end caps alone, and there were multiple instances of redundant signs, for example two signs on the same door saying the same thing. Signage abundance was less of an issue in the school libraries, with 203 signs in the elementary school library, 93 in the middle school library, and 139 in the high school library.

In all library types, issues were found with signs. Common issues across all three library types were unclear signs, outdated signs, damage to signs, damage to sign holders, and other. One of the “other” issues that became specified into its own category in the academic library was use of ad hoc signs, which upon review of the data from iterations 1 and 2, was also common in the public and school libraries. Some ad hoc signs are printed, but in all three types of libraries, ad hoc signage also included handwritten signs, sometimes on Post-It notes.

Future research goal: Developing a signage formula

Literature suggests libraries should conduct a signage inventory or audit, but they do not explain how to take the results of that research and apply it to determining the quantity and ratio of types of signs needed in a given library facility (Brown, 2002; Bryan, 2007; Serfass, 2012). As Polger and Stempler note, “there remains a lack of specifics about creating a comprehensive signage system” (2014, p. 68), and any such specific guide needs to have a formula through which a library’s staff can calculate how many signs is the “right” number for their library.

Much of the library signage literature focuses on adhering to a signage system to maintain a unified look (Brown, 2002; Polger and Stempler, 2014; Serfass, 2012), which is an effective concept. However, this does not tell a library’s staff about the types of signs their users need, how many signs their users need to have sufficient guidance, or at which point the quantity of signage becomes so many signs that users don’t see any of them. Signage design needs to consider a variety of factors, including knowledge of the library’s collection (Brandon, 2002) and complexity of the library facility (Baker et al., 2015). Every library is unique in its users, funding, services, collections, facility, etc. Therefore, it makes sense that every library has unique signage needs. That does not mean, however, that a formula cannot be developed that accounts for the factors that make libraries unique while still delivering answers to the questions of how many signs are needed to effectively guide users’ wayfinding without overwhelming them, what the ideal ratio of directional to informational to regulatory signs is, and at what point the line is crossed into having too many signs.

An important area for future research is to address this problem by developing a formula for library staff to assess signage on a set collection of criteria based on the library facility and

users' needs so they can calculate the total number of signs and ratio of types of signs that are optimal for enhanced wayfinding, as well as the number of signs that constitute the point of "too many" signs. Such research should be guided by questions like:

- How many signs are enough to be effective?
- What ratio of directional to information and regulatory signs is necessary for the signage system to be effective?
- At what quantity of signs does the system become too overloaded to be effective?
- Is it possible to develop a formula of library signage that would be accurate at calculating the ideal quantity and ratio of signage for a given library, and which of the factors that make libraries unique need to be incorporated into such a formula to make it accurate?

Libraries are told over and over in the literature to avoid too many signs and that no signs are better than too many signs or the wrong kinds of signs. But no one says how to determine how many signs are too many signs for a specific library. The design literature is full of ways to calculate a library's space needs, so why is there no way to determine a library's signage needs? A formula by which library staff can assess the appropriate number and types of signage for their libraries based on the factors that make each library unique, the facility and the users, would be of extreme significance to a field that has an appreciation for formulas to determine other facility needs, such as space allocation. Development of such a formula acknowledges the importance of signage and problems with signage that impact library users.

Conclusions

Signs are wayfinding aids or markers that support navigation and are integral to the wayfinding process (Arthur and Passini, 1992). Patrons expect that these wayfinding tools will exist in public spaces, such as libraries, and that they will be useful in guiding them as they navigate those facilities. Yet, current research shows that patrons are still getting confused and lost when trying to locate specific areas in libraries (Baker et al., 2015). Libraries need to provide signage that instructs users, reduces anxiety, mitigates negative experiences, and maximizes the user-friendliness of the environment. It is this need that led to this research and the initial step of developing a method for inventorying and assessing signage in multiple types of libraries. The iterative research presented demonstrates that this is indeed a viable method that is adaptable for different types of libraries, while still providing a standardized coding scheme for assessing library signage. Adoption of this method and instrument across a wider variety of libraries, with sharing of data, will lead to the development of more specific signage guidelines for a library given its type (i.e., academic, public, school) and unique criteria. This will ultimately allow libraries to provide effective signage that guides patrons from place to place in library facilities.

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