J. ENVIRONMENTAL SYSTEMS, Vol. 17(1), 1987-88

USER PREFERENCE AND MEANING IN AN EDUCATIONAL FACILITY: PART I

ROBERTA L. KILTY-PADGETT
College of Human Ecology
Michigan State University

ABSTRACT

This article addresses user preference and meaning associated with environmental variables in a recently constructed building at Michigan State University by handicappers and non-handicappers. The study focused on two issues: 1.) use of space; and 2.) meaning and symbolism. An approximately equal number of handicappers with mobility handicaps (N = 16) and non-handicappers (N = 20) volunteered to follow building scenarios prior to questionnaire administration. Additionally, sixty-one randomly chosen building users were interviewed in a shorter version of the original questionnaire to reflect every day facility usage. Recognition of the handicapper entryway as something other than a main or secondary entry supported the connotation of stigma. Stigma was not associated with interior components: restroom stalls and drinking fountains. The Chi-square test showed no significant differences in preference for restroom stalls. Generally, people of both groups showed no preference or preferred to use the barrier-free drinking fountain. Building familiarity was not a critical factor.

INTRODUCTION AND LITERATURE REVIEW

In current practice, universities are constructing facilities intended to be responsive to handicapper needs based on criteria of ANSI A117.1-1980 [1] and the Rehabilitation Act of 1973. The question arises as to whether this intent is being realized. The purpose of this study was to compare perception and behavior of handicappers and non-handicappers in Michigan State University's recently constructed Chatterjee Communication Arts and Sciences (CAS) building, an educational facility considered to be handicapper responsive. This report summarizes only those findings related to user preference for and meaning associated with building entries, restroom stalls, and drinking fountains. The code checklist, scenario descriptions, and wayfinding data are included in Part II (forthcoming).

doi: 10.2190/KURH-8DAT-GFL9-NE0A
http://baywood.com

Even though handicapper accessibility and use were studied extensively in the 1970s, there is a paucity of studies in the literature which evaluate the built environment using handicapped individuals and even fewer which evaluate the built environment using both handicappers and non-handicappers. This university sponsored post occupancy evaluation (POE) has taken an initial step toward this end, with the underlying assumption that concepts of user preference and human dignity are important. It is necessary for the study of settings where handicappers and non-handicappers function and interact to incorporate the needs and opinions of both user groups. The literature cited below emphasize human needs, user input, and the responsibilities of designers and design researchers.

To create environments which can be used with dignity, Morgan indicated that designers need to consider human needs in general and cannot create a barrier-free environment without the extensive input of users into the design process and an examination of human performance within the physical environment [2]. Cohen believes that educational environments that integrate handicappers and non-handicappers should provide settings for activities that allow all to interact in ways that support peoples' similarities rather than accentuating their differences [3]. Morgan [2], Steinfeld [4], Stephens [5], Leonard [6], and Park [7], suggest that separate, special accommodations in areas not commonly used by the majority of those not handicapped label and stigmatize the user. Steinfeld, Duncan, and Cardell concluded that the built environment speaks a "silent language" that transmits messages about appropriate behavior and meanings [8].

The problem statement posed in this study is: does the building perform as and convey an environment more responsive to handicapper needs?

Context and Conceptual Background for the Evaluation

The CAS building, constructed between 1979 and 1981, houses five departments of the College of Communication Arts and Sciences at Michigan State University as well as the University's radio and television broadcast services. The 240,000 square foot building, located on the south side of campus, occupies an eleven-acre site at the southeast corner of Wilson and Red Cedar Roads. Programmed to accommodate 5,676 students (course enrollments per term), the facility meets instructional television, broadcast television, and other media related needs of students and faculty.

The CAS building has been acclaimed superior in barrier-free design and responsiveness to handicapped needs in "Scope"[1] and in "The State News" as reported by the M.S.U. Acting Director of Facilities Planning and Space Management. The University Office of Handicapper Services considers this building among those at the leading edge of barrier-free design.

[1] The architectural firm's brochure available to potential clients in their office.

METHOD AND APPROACH

Three methods were used in the study:

1. checking for compliance with standards and codes as set forth by ANSI A117.1-1980, the State of Michigan Barrier Free Code, November 1979, and M.S.U.'s Construction Standards, July 1978;
2. user performance on-site documentation using behavioral mapping techniques; and
3. measuring perceptions and opinions through interviews, either pre-scheduled or arranged randomly at the site.

A multi-method technique facilitates information gathering not available on the basis of a single technique. This report is based on findings from the third method and represents a portion of the client summary report. The POE study focused on the public areas of CAS. It was aimed at application to improve the existing environment and to guide design of future facilities.

The Users

Building users include faculty, staff, students, and visitors. For reasons of breadth and generalizability, and to get a broad perspective of design suitability, the sample included representatives from each user group and participants were asked to identify themselves if handicapped [9]. Table 1 shows that sixteen participants with severe mobility handicaps were observed and interviewed. Seven of these identified auditory, visual, and/or dexterity/manipulation characteristics in combination with mobility. Reliance on volunteers in accord with human subject protection requirements and study completion time constraints resulted in a dominance of mobility characteristics.

Sample Size

An approximately equal number of handicappers with mobility associated handicaps ($N = 16$) and non-handicappers ($N = 20$) volunteered to participate in building scenarios prior to answering questions concerning their experiences. Handicapper scenario participation was recruited through the MSU Office of Handicapper Services, its Student Advisory Board, and at the community level, yielding sixteen volunteers. Twenty non-handicapper scenario volunteers were recruited through public advertising. They participated in one of five prescribed building scenarios, while a trained observer documented the experience and conducted an interview lasting approximately one hour. To reflect an every day usage of the building, sixty-one additional participants were chosen randomly on-site as they entered the building, agreeing to answer questions in a shortened version of the original questionnaire. The study was conducted at various times of the year to encompass seasonal variables.

Table 1. Handicapper Characteristics

	Respondents																*Row Totals*	
	012	*016*	*023*	*026*	*027*	*028*	*029*	*030*	*031*	*032*	*033*	*035*	*036*	*037*	*038*	*039*	*N*	*%*
Mobility Characteristics	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16	(66.6) (100.0)
In combination with:																		
Auditory Characteristic	1							1						1			3	(12.5)
Visual Characteristic						1			1			1					3	(12.5)
Dexterity/Manipulation Characteristic												1	1				2	(8.3)

Even though the handicapper sample size was small, it was respectable. Another study using small samples is that of Zimring and Templar, in which twenty-four and sixteen sight-related handicappers respectively were tested in a two-part study to evaluate material texture in relationship to building knowledge [10]. From these small samples, they were able to identify a number of relatively clear conclusions.

The Questions

The questionnaire contained 187 questions which covered user preference and opinion, wayfinding, and use of specific classroom settings. The following critical questions concerned positive and negative connotations attributed to the facility by participants and are the basis of this report:

1. Which do you think is the main entryway?
2. Do you find the use of stall #005 of negative connotation as compared with the remaining stalls?
3. Do you find the drinking fountain on the left or right of negative connotation as compared to the one remaining?

Descriptive summary statistics were performed on all questions using a main frame computer and the Statistical Package for the Social Sciences (SPSS). Cross tabulations were performed on the demographics and twenty-five short-form questions. Data were analyzed separately for the thirty-six scenario participants and in combination for the ninety-seven total respondents. The Chi-square test was used to differentiate handicapper and non-handicapper responses where appropriate. The six entryways involved in the study are shown in Figure 1, the restroom stalls and drinking fountains in Figure 2.

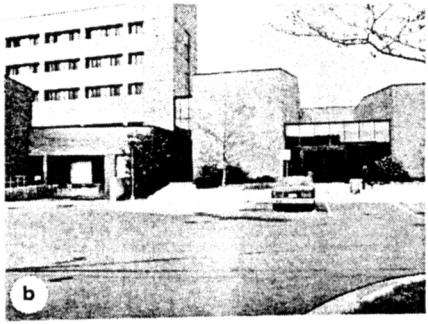
RESULTS

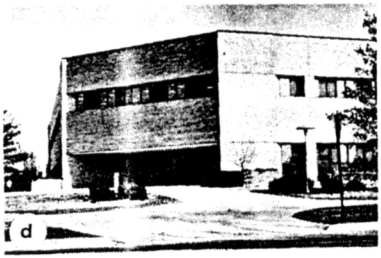
For the most part, the building meets state codes and national standards. There are discrepancies in the mounting of some hardware and accessories, as well as problems with some door closures and bevelled thresholds. Corridors of some restrooms make maneuverability of wheelchairs difficult, despite observance of minimum clearances. Notwithstanding, the CAS building is the most accessible of any on campus. The code checklist is included in Part II (forthcoming).

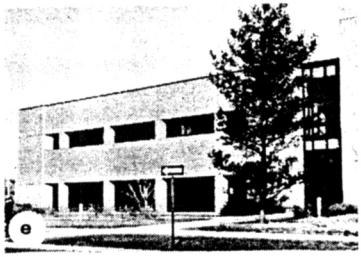
Entryway Differentiation

By architectural intent, entry 163 was designed as the main entryway. Participants perceived entries 100A, 149, and 163 to be about equal as the main entry (Table 2). No one, handicapped or not, thought the handicapper entry 143 was the main or even secondary entrance. This recessed entry is difficult to see from 145B and from handicapper parking stalls (Figure 1).

a) S 100A - Visual merging
b) Loading dock, E 143 and E 145B - Limited visibility between 143 and parking; between 143 and 145 B.







c) NE 149 - Visible from Wilson Road
d) NW 163 - Main entry at Red Cedar and Wilson Roads
e) W 178 - Secondary entrance

KEY PLAN

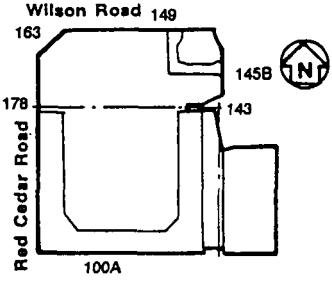
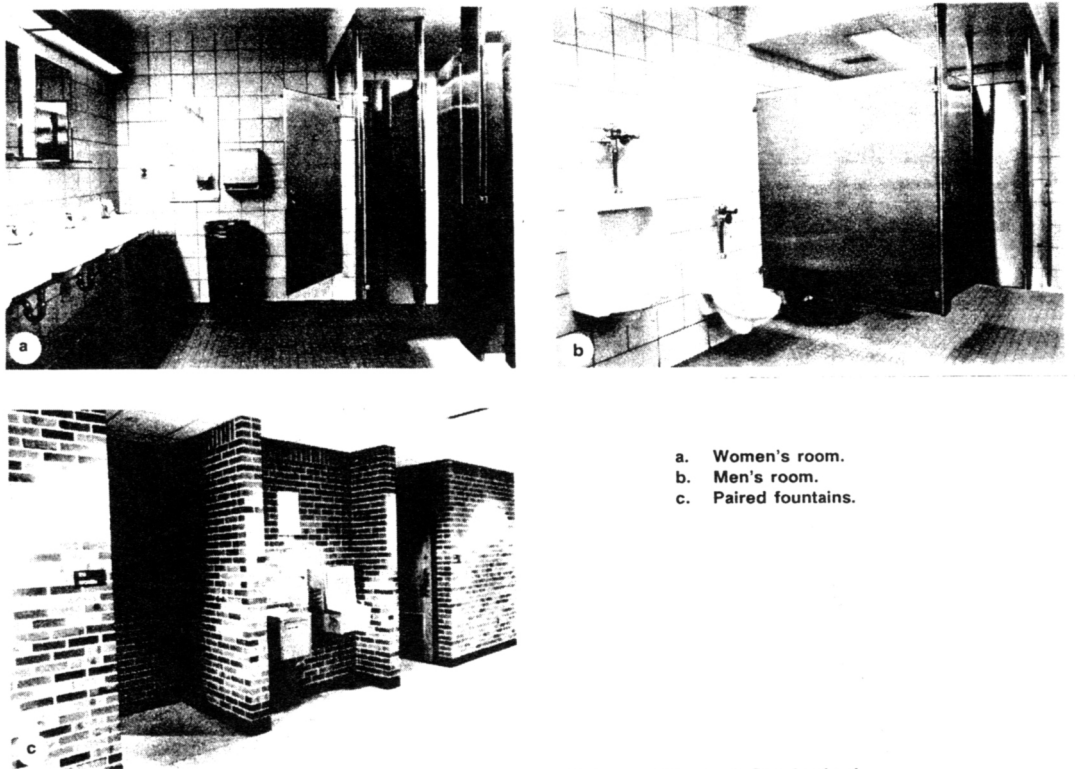


Photo credit Laura J. Quackenbush

Figure 1. CAS building entries.



a. Women's room.
b. Men's room.
c. Paired fountains.

Photo credit Laura J. Quackenbush

Figure 2. Restrooms and drinking fountains: a.) women's room; b.) men's room; c.) paired fountains.

Table 2. Main Entryway Differentiation by User Group

	Entryway as Main Entry						*Row Total*	
User Groups	*100A*	*143*	*145B*	*149*	*163*	*178*	*N*	*%*
Handicappers (Scenario)	6	0	1	2	5	2	16	(16.5)
Non-handicappers (Scenario)	4	0	0	5	11	0	20	(20.6)
At Random Participants	19	0	0	25	17	0	61	(62.9)
All Respondents (%)	29 (29.9)	0 (0.0)	1 (1.0)	32 (33.0)	33 (34.0)	2 (2.1)	97	(100.0)

Table 3. User Preference in Restroom Stalls

	Scenario Participants					
	Hc[a]		*N-Hc*[b]		*Row Total*	
Preference	*N*	*%*	*N*	*%*	*N*	*%*
Non-specialized Stall	2	(9.1)	7	(31.8)	9	(40.9)
BF Stall	8	(36.4)	5	(22.7)	13	(59.1)
Column Totals (%)	10	(45.5)	12	(54.5)	22	(100.0)

[a] Handicapper
[b] Non-handicapper

Restroom Stalls

This section summarizes the distribution of responses to questions concerning preferences and perceived differences among restroom stalls (Figure 2). General comments concerning the restrooms and stalls were positive as those which follow:

- The stall was nice, wide, and long enough to get in, dismount and remount without the door being open.
- Bathrooms fairly comfortable to use.
- Having every restroom and door handles throughout accommodating good.
- There is a barrier-free restroom on every floor. It has lever style door handles on every door—it's unique—they've gone above and beyond the code.

Twelve women and ten men participated in scenarios involving use of the restrooms. While the Chi-square test with an alpha of .05 (n = 22) showed no significant differences in preference of restroom stalls between handicappers and

Table 4. Barrier-Free Stall of Negative Connotation?

	Scenario Participants					
	Hc[a]		*N-Hc*[b]		*Row Total*	
Responses	*N*	*%*	*N*	*%*	*N*	*%*
Negative	1	(4.5)	1	(4.5)	2	(9.1)
Not Negative	9	(40.9)	11	(50.0)	20	(90.1)
Column Totals (%)	10	(45.5)	12	(54.5)	22	(100.0)

[a] Handicapper
[b] Non-handicapper

Table 5. Perceived Difference Between Paired Fountains

	Scenario Participants						*All Respondents*					
	Hc[a]		*N-Hc*[b]		*Row Total*		*Hc*[a]		*N-Hc*[b]		*Row Total*	
Responses	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Perceived Difference	7	(50.0)	6	(42.8)	13	(92.9)	7	(17.1)	27	(65.8)	34	(82.9)
No Difference	0	(0.0)	1	(7.1)	1	(7.1)	0	(0.0)	7	(17.1)	7	(17.1)
Column Totals (%)	7	(50.0)	7	(50.0)	14	(100.0)	7	(17.1)	34	(82.9)	41	(100.0)

[a] Handicapper
[b] Non-handicapper

non-handicappers, eight (80%) of the handicappers preferred the stall of barrier-free design (BF). Close to half of the non-handicappers preferred the BF stall (Table 3). The reasons most often cited for preference were interior size and convenient location whether the respondent was handicapped or not.

BF stalls did not have a negative connotation (Table 4). Similarly, neither handicappers nor non-handicappers attributed a negative connotation to the non-specialized stalls. The Chi-square test (alpha .05, $n = 22$) showed no significant differences in the opinions of the two groups.

Drinking Fountains

Not only did people have a choice of geographical location, but also between side-by-side units. The three sets of paired fixtures in the CAS building have one BF fixture in each (Figure 2). All single fixtures installed in the CAS building are BF units.

All respondents who used paired fountains were asked if they recognized a major difference between them, to which thirty-four (82.9%) replied yes (Table 5). User responses showed that handicapped people preferred the BF fountain, and non-handicappers had no real preference (Table 6).

Table 6. User Preference in Paired Fountains

	Scenario Participants[a]					
	Hc[b]		*N-Hc*[c]		*Row Total*	
Preference	*N*	%	*N*	%	*N*	%
A. Fountain	1	(7.1)	0	(0.0)	1	(7.1)
B. BF Fountain	5	(35.7)	3	(21.4)	8	(57.1)
C. No Preference	1	(7.1)	4	(28.6)	5	(35.7)
Column Totals (%)	7	(50.0)	7	(50.0)	14	(100.0)

[a] At random participants were not asked this question.
[b] Handicapper
[c] Non-handicapper

Table 7. Barrier-Free Fountain of Negative Connotation?

	Scenario Participants					
	Hc[a]		*N-Hc*[b]		*Row Total*	
Connotations	*N*	%	*N*	%	*N*	%
Negative	1	(7.1)	0	(0.0)	1	(7.1)
Not Negative	5	(35.7)	7	(50.0)	12	(85.7)
Undecided	1	(7.1)	0	(0.0)	1	(7.1)
Column Totals (%)	7	(50.0)	7	(50.0)	14	(100.0)

[a] Handicapper
[b] Non-handicapper

To ascertain whether or not people attributed stigma to the BF fixture, fountains were referred to as the left or right fountain in the questionnaire. Table 7 presents opinions of scenario participants, and Table 8 presents those of at random participants (who were instructed to answer the fountain questions if they had used one of the paired fountains that day).

Twelve of fourteen (85.7%) scenario participants did not attribute a negative connotation to the BF fountain, while one handicapped user did (Table 7). The Chi-square test (alpha .05, $n = 14$) showed no significant difference in opinion between handicappers and non-handicappers. Nor was there a negative connotation to the non-specialized fixture. There was no difference between scenario and at random responses, with participants agreeing that neither fountain carried a negative connotation (Table 8).

Table 8. Was Either Fountain of Negative Connotation?

At Random Participants		
	Frequency	
Connotations	*N*	%
Negative	1	(4.0)
Not Negative	21	(84.0)
Undecided	3	(12.0)
Column Total (%)	25	(100.0)

DISCUSSION AND CONCLUSIONS

Although the sample size using handicappers was small, a number of findings are readily apparent. Scenario participants' opinions did not differ from those of random participants in the three aspects of the study reported here, nor did it appear to be important if a participant was a handicapper, a first time, occasional, or frequent user of the building with regard to these particular questions. The results reported in this study were not dependent on the scenario method utilized, except to ascertain the identity of actual fountains used. If stigma were the only area of interest, a similar study could be conducted which would be less time consuming and would achieve similar ends. The scenario method allowed the researcher to analyze orientation and wayfinding difficulties in addition to meaning and symbolism findings reported here.

Handicapper entry 143 houses the mail room and is adjacent to the trash compactor and receiving areas, making this entry less tasteful. Its special features such as the snow melting system and automatic doors were incorporated only after receiving handicapper input. Since this input was sought late in the design process, other structural features caused 143 to be selected as the handicapper entrance. Other aspects of this study, particularly wayfinding, showed this entrance to be less than desirable for handicappers since the information desk is at the opposite end of the building (entry 100A). The locked corridor with direct 100A access is not for public use. While all entrances meet the minimum code requirements for handicappers, only three have adjacent parking. There are six handicapper spaces outside entries 143 and 145B which are approximately thirty feet apart. There are two spaces outside entry 100A in the main parking lot. This causes most handicappers to use 143 in spite of accessibility features of other entryways. Physical attributes aside, no one associated "handicapper entry" with any entry considered important by participants in this study, thus separating and stigmatizing handicapped users.

Nearly all the participants whether handicapped or not felt there was no negative connotation associated with the BF stalls. The reasons given almost exclusively for preferred use of the BF stall were interior size and convenient location. Since BF stall was without negative connotation and was preferred by handicappers and non-handicappers alike, it would seem reasonable to make all restroom stalls the same size (36"W x 72"L) thus supporting peoples' similarities, rather than differences. In this building the net cost in increased space used for this purpose would be about 125 square feet out of 240,000 gross square feet within the structure (.05%).

While participants agreed there was a clear distinction between BF and non-specialized fountains, they did not attribute a negative connotation to the BF fountain. Since handicappers preferred to use the BF fountains, and non-handicappers had no real preference, it would appear that installation of BF fountains rather than two designs throughout the building would not offend most people, and would be more economical.

Further studies are needed with larger numbers of subjects representing a variety of handicapper characteristics. As Zimring and Reizenstein recommend, POEs should be conducted by a wider range of researchers, such as designers and others to increase its use and relevance.

ACKNOWLEDGMENT

This study was supported in part by All-University Research Initiation Grant, Michigan State University.

REFERENCES

1. ANSI A117.1, *Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People,* American National Standards Institute, New York, NY, 1961 (rev. 1971, 1980).
2. M. Morgan, Beyond Disability: A Broader Definition of Architectural Barriers, *AIA Journal,* pp. 50-53, 1976.
3. U. Cohen, *Mainstreaming the Handicapped: A Design Guide,* Wisconsin University, School of Architecture and Urban Planning, Milwaukee, WI, 1979.
4. E. Steinfeld (Project Director), *Access to the Built Environment: A Review of Literature,* U. S. Department of Housing and Urban Development, Government Printing Office, Washington, D. C., 1979.
5. S. Stephens, Hidden Barriers, *Progressive Architecture,* April 1978.
6. E. Leonard, The Handicapped Building, *Rehabilitation Literature,* pp. 265-269, September 1978.
7. L. D. Park, Barriers to Normality for the Handicapped Adult in the United States, *Rehabilitation Literature,* pp. 108-111, April 1975.

8. E. Steinfled, J. Duncan, and P. Cardell, Towards a Responsive Environment: The Psychosocial Effects of Inaccessibility, in *Barrier-Free Environments,* M. J. Bednar (ed.), Dowden, Hutchinson, and Ross, Inc., Stroudsburg, PA, 1977.
9. C. Zimring and J. Templer, Wayfinding and Orientation by the Visually Impaired, *Journal of Environmental Systems, 3*:4, pp. 000-000, 1984.
10. C. M. Zimring and J. E. Reizenstein, Post-Occupancy Evaluation: An Overivew, *Environment and Behavior, 12*:4, pp. 429-450, 1980.

Direct reprint requests to:

Roberta L. Kilty-Padgett
Department of Human Environment and Design
College of Human Ecology
Michigan State University
East Lansing, MI 48824-1030