

The Effectiveness of Communicative Instruments For Blind Visitors

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Introduction

The Framework of 'Visitor Special Needs'

Visitor special needs considerations are more a dream than a reality in most museums. In 1988, the Royal National Institute for the Blind in London sponsored research in 2400 museums and galleries to better understand patterns of accessibility. In very few cases did museums have material or objects for disabled visitors.

There is a lengthy history regarding museums and blindness. The literature indicates the existence of specialized institutions, an abundance of experience with a variety of exhibit contents, and sets of recommendations for exhibit designers specifically for the blind. In addition, the Royal National Institute for the Blind organized the Seminar entitled Talking Touch, The Foundation de France - ICOM, in 1991, sponsored *Museums without Barriers: A New Deal for Disabled People*. Also, there are at least three programs which offer information about museums and blindness: one in New York — *Access to Art Program* in the Museum of American Folk Art, and two in Massachusetts — *Access Network for Museums* in the Old Sturbridge Village and *Adaptive Environments* in the Massachusetts College of Art. One can also obtain information through the American Foundation for the Blind.

By contrast, there are few empirical studies or evaluations on the effectiveness of these kinds of accommodations and recommendations. Research suggests four main issues: orientation, touch, communicative

tools (especially the use of Braille), and new technologies. However, the knowledge accumulated about the psychology of blind visitors (Warren, 1994, Asensio & Simón, 1995; Simón, Ochaíta & Huertas, 1996; Simón, 1997) and the education of the blind (Scholl, 1986; Simón y Asensio, 1997) is not always consistent with recommendations being made.

The Tiphologic Museum

We use the term 'tiphologic' to refer to everything about blind culture. The Tiphologic Museum is a special project of the National Organization for Blind people in Spain (O.N.C.E.). The Tiphologic Museum contains four different areas. The first, and most important, are the tactile models which represent famous monuments of the world. This area has two parts. The first part contains seventeen national monuments that visitors can see and touch. The second part contains fifteen international reproductions of monuments of very different styles, ages, and geographical or cultural settings. The second area is a gallery dedicated to the exhibition of painting and sculpture by visually impaired artists. The third area, on the second floor, is a gallery with objects and machines from the material culture of the blind. There is a special room for antique Braille books. The fourth area is a gallery for temporary exhibits.

Study Objectives

The main objectives of this research project were (a) to perform a general summary museum evaluation to include:

- the **use of the space** - blind visitors often have specific mobility problems requiring that museums create a clear orientation and wayfinding system for galleries. The use of space has two important aspects — *physical and cognitive access*;
- the **type of displays** - which displays blind visitors used and what behaviors they exhibited in front of these displays;
- the **impact of the exhibit** and the **impact of the different elements** present in the galleries; and
- the **visitor profile** using demographic and psychographic characteristics;

and (b) to study visitor leaning during the visit. We were interested in the evaluation of the learning potential of museum materials, especially with regard to the architectural models. We wanted to know the type of access to artistic information that tactile exploration permits. Visual exploration is holistic, we receive information in parallel, but tactile exploration is serial, we receive information successively, element by element. This very important difference makes serial exploration difficult for the comprehension of diverse material, especially when a person needs a holistic view, as in understanding the facade of a building. Also, we know that blind people develop very useful cognitive strategies to compensate for the absence of visual stimulation (Warren, 1994).

Method

Research Design

We developed two consecutive and complementary studies. The first one, was a general summative evaluation about the galleries, where we studied the behavior of sighted and blind visitors in the exhibition. It was a descriptive study which employed two classical techniques, (a) observation of behavior in the galleries and (b) surveys. With these tools we tested the useful time that a visitor spent in front of a display, registered the paths used around the galleries, and compared the impact of the different galleries and elements in the galleries.

The second study was focused on blind visitors specifically, and was a quasi-experimental study which addressed visitor learning in galleries and also studied the best ways to communicate information about artistic knowledge. We designed a pre-test / post-test situation with two tasks:

- a) A *Specific Knowledge Task* was designed to check verbal specific knowledge about the content of the gallery. We selected six very well known national and international monuments from different ages and principal styles: The Parthenon (Greek), The Roman Aqueduct in Segovia (Roman), The Great Mosque of Cordoba (Arabic), The Cathedral of Santiago de Compostela (Romaine-Barroco), The Cathedral of Burgos (Gothic), and The Gate of Alcala (Neo-Classic). We balanced monuments between the

pretest and the posttest. We asked ten questions about different characteristics of each monument (style, materials, size, plan, arches, exterior decoration, interior decoration, columns, doors and towers). Answers were coded using a three level scale: 0 = visitor did not respond with anything to the question; 1 = visitor was able to provide isolated details about the monument; and 2 = visitor provided correct answer.

- b) A *Tactile Recognition Task* was based on questions about three important and very well known architectural elements (arches, facades and plans), and was presented in relief (thermocopies). We presented eight arches, four facades and seven plans. Some of them were present in the museum's monuments. Blind visitors were expected to recognize and discriminate the names, characteristics, contents, and monuments which contain these elements, and provide any other information about them. Responses were coded using a similar scale mentioned previously. Visitors completed the test before and after the visit.

Sample

Respondents of different ages and educational levels were selected for this study — Primary School (12-13 years old), High School (16-18 years old) and Adults (around 40 years old) with an average general background and educational level. Numbers of subjects in each study are shown in Table 1.

Procedure

The first study did not present any special problems. We controlled behavior, times, and paths following typical visitor studies procedures (Asensio & Pol, in press). We observed visitors during the visit and asked questions of them at the end of the observation.

In the second study we used a more original approach. We tested visitor knowledge before and after the visit. During their visit, blind people had two sources of information. They could either touch the monuments or they could listen to the guide's verbal explanations about them. We manipulated the information presented to blind visitors about each monument.

Visitors could touch the facades, and, in one condition, the guide told them about it. In relation to the Arches, they could touch it but the guide didn't talk about it. Finally, with regard to the Plans, there was no tactile information provided but the guide gave explanations.

In summary, the information that each visitor received was tactile only for the *arches*, verbal only for the *plans*, and both verbal and tactile for the *facades*. We compared knowledge gains between the pre- and the post-test evaluation in these three situations to understand the impact of these different forms of information.

Results - First Study

Time Spent in Front of the Displays

We found that the blind spent more time than sighted visitors in front of displays, but that both blind and sighted visitors spent insufficient time to really understand the displays. National models were more attractive for both groups than the international models, but among blind visitors, the difference was greater than among sighted visitors. The others parts of the museum were practically ignored by visitors.

Impact and Preference Survey Results

The general impressions of visitors were good, but in some cases (approximately 20 percent of blind and sighted visitors) visitors indicated that the museum did not respond to their expectations. A very high number of visitors, especially among the blind, expected to see monuments that related to locations present in their everyday life. The area most appreciated by visitors was the gallery containing the models (82 percent). Only about four percent of the visitors mentioned the paintings and sculptures area, and less than one percent named objects or areas from the material culture gallery. Several people made explicit their dislike for the painting and sculpture works because they are 'abstract'. To understand styles, and especially the abstract style is very difficult (see Asensio & Pol, 1996; and Pol & Asensio, 1997 in this volume).

Results suggest that models are the most valued elements in the museum, but what kind of models? There are not consistent criteria for considering the attraction or the rejection of a model. In an important

number of cases, people like a model because it is the only one which they know something about it, or they reject it saying, "I never saw it before". Overall, they preferred the bigger and more elaborate models and rejected the smaller and simpler ones.

Paths Around the Galleries

Both sighted and blind visitors were attracted to the two galleries which contain national and international models. Visitors spent the most of their 'whole visit time' and all their 'useful time' in these two galleries. The other two galleries of the principal floor, dedicated to Fine Arts (painting and sculpture), were visited by very few people and nobody stopped in front of the displays. The museum has another floor, which is dedicated to blind culture material, but during our study only one sighted visitor went to this area.

While a general path was clear, particular paths into the each gallery were not. When we compared the paths of different people, we did not find a consistent pattern, each visitor picked a different way. Most paths (85%) were incomplete. Visitors did not go around the whole gallery but only parts of the gallery, leaving some models unnoticed. One of the problems is that the museum does not mark a clear path. The model placement does not follow a logic sequence: chronological, stylistic, cultural, thematic, iconological or geographic.

The Use of Communicative Supports

In the galleries there are the following communicative media supports: a) *Texts (ink and Braille)* which describe each model and provide information about the style, formal characteristics, age, localization, iconology, historic context, and curiosities (the text is in macro-characters which can be read by several people with visual impairment and sighted people); b) *Labels (ink and Braille)* which provide little text but give name, age and location of the monument; c) *Audios* which describe the model in the same way as text with two levels of information — an audio system with the same information as texts and an audio system with more complementary information for visitors desiring more information; d) *Guides* who are visually impaired professionals who explain the museum to the visitors (the Museum provides guides for groups but not for

individual visitors, blind or sighted) and, e) *Touch displays* where visitors can experience tactile exploration of a model.

The results showed that there were no differences between the two galleries containing national and international monuments. Graph 1 shows the combined percentages of visitors who use the different kinds of elements in both galleries. We expected to find a low level in the use of the text, however, we did not expect that visitors would not use text at all. Very few visitors used the audios (see Graph 1). Only ten percent of the individual blind visitors used the audio. As we explained before, audios have two levels of information, but the mechanism which made the selection of the advanced level was not easy to access and was not explained anywhere. Visitors listened to a level without knowing that there was another level choice. Noise was the other unsolved problem. Models are very close and there were more than fifteen models in a gallery. When visitors used an audio they experienced uncomfortable interference from other audios.

The results about the use of guides is obvious. There were some significant comments about the guided visit. First, the guided visitors encountered problems touching the models. Second, our results indicate that blind individual visitors typically come to the museum with someone, generally a relative or friend, who acts as a guide to facilitate the access to the building and the access and routes around the galleries. So, blind people did not need to orient themselves in the museum, other people did that for them.

Touching objects also caused some unexpected problems. Similar to Braille text, touching objects is a source of information for blind people in museums. Also, many times touching provides information for all visitors. However, the results are ambiguous. As you can see in the graph, touching is common only when blind visitors visited in group and when a guide encouraged touching the pieces. When blind people are alone, to touch seemed unnecessary. Almost half of the blind visitors did not touch a model even though they knew that they could touch. In a museum designed for touching, if visitors do not touch there is something wrong. One reason for not touching could be fatigue. We observed that interest decreased progressively throughout the visit. Probably because tactile processing is very tiring, blind visitors who touched the models showed more clear symptoms of fatigue and lost interest in the last models.

Results - Second Study

A pre- and post-evaluation were designed with two tasks — Specific Knowledge and Tactile Recognition, to assess learning during the visit and to compare different sources of information.

Specific Knowledge Task

A three by two repeated measures analysis of variance was conducted to analyze age as represented by instruction level (secondary, high school and adults) and time of evaluation (before and after the visit). We used the Scheffe Multiple Comparisons index ($p < .05$) to test for differences between groups. Results are shown in Table 2.

Results showed a significant statistical difference only for the first factor, age and instruction ($F=20.32$, $p > .002$). Adults obtained higher task scores than the other two groups, but there was no significant differences between the group scores. Older and more educated blind visitors know more about the monuments than younger visitors. This is an expected result because blind people who are older have more knowledge about the specific content. But the more important result is about the second factor — visitors did not improve in post-test responses compared to the pre-test. In other words, we did not find that visitors improved their knowledge during the visit. We suspect this may be the case because not all the questions corresponded with the learning during the visit.

Examining the differences between the ten questions in the pre and post-test, we found three significant statistical differences: question about the style ($F=5.92$; $P=.005$); the question about the plan ($F=8.16$ $P=.029$); and question about exterior decoration ($F=8.02$ $P=.03$). It is interesting to compare which questions improved with the visit and which ones did not. The knowledge about the style, the plan, and the exterior decoration increase throughout the visit. On the other hand, knowledge about materials, size, arches, interior decoration, columns, doors and towers, do not increase throughout the visit. These conclusions will be discussed later.

Referring to Tactile Recognition Task we performed a three by two repeated measure analysis of variance between age as represented by instruction level (secondary, high school, and adults) and time of test (pre

or post-test). Results showed that there was a significant statistical difference for the second factor, the pre and the post-test evaluation ($F=20.34$, $p>.002$). In this case we did not find a statistical differences with age. Probably tactile strategies are likely more developed in blind people at this age and the content of the task is too specific to find differences. This is an important point because it indicates that, when the task is tactile recognition, blind visitors showed an improvement in knowledge.

Tactile vs. Verbal Processing

There is still the question whether (tactile or verbal processing) is the most effective source of information. The question can be addressed by comparing the three different kinds of elements — arches, plans, and facades which represent three different sources of information — tactile, verbal, and both.

When we did a Repeated Measures Analysis of Variance we found significant statistical differences for the three kind of elements: arches ($F=10.67$ $P=.017$), facades ($F=24.74$ $P=.003$) and plans ($F=13.6$ $P=.010$). Consequently, touching, listening, and the combination of the two are useful for improving visitor knowledge during the visit. However, it is very interesting to compare the gains between pre and post evaluation in the three groups (see Table 3).

As Table 3 suggests, the gain in the case of the arches, where people received information only by touching was 1.1, the lowest total task score. The gain for the facades was 2.4, where people received information by touching and listening to the guide. Finally, the gain for the plans was the highest, 3.0, where visitors received information only in a verbal format. According with this information, results showed that blind visitors learn more when information is only verbal. Second best is when information is in both formats, and the worst situation is when they receive information only by the touch.

Conclusion

We should consider the special needs of visitors. If we do, we will also be adapting the museum to the needs of general visitors, not only those who are disabled. More research and experimentation is needed in

exhibit planning and design which focuses on the special needs of visitors. Furthermore, evaluation studies of this work is also needed throughout the exhibit development process. Discussions about blind visitors in museums have revolved around four issues: accessibility, Braille, touching, and new technologies. In our opinion, these four are the most important issues for blind visitors in the galleries, but the impact of these issues on visitor learning is not well understood. By spending a lot of money and attention on unnecessary issues related to blind visitors we may be ignoring more fundamental problems. First, an ideal museum exhibit or room for blind visitors is not necessarily the ideal exhibit or room for sighted visitors, and second, we do not yet fully understand if current exhibit and access recommendations for blind visitors are effective.

Usually, accessibility is considered as only a mobility problem. Access to museums and museum exhibits however is much more. The first objective is to create, among the blind, the need or desire to visit museums. We should understand the concept of accessibility in a broader sense. Mainly, access is not just a physical problem, it is not only the possibility of getting to the galleries and the objects, but also cognitive access where visitors obtain and understand an internal representation of museum space, the structure of the galleries, the organizations of the objects, and the meanings of exhibit messages. Braille signs are insufficient for this kind of representation, and it is not practical to install Braille in all galleries. There is a contradiction between the insistence to put Braille text for blind people and the fact that blind people don't use it. But this is not a strange situation if we keep in mind that Braille reading poses problems. The current research on Braille reading suggests that Braille systems have specific characteristics and difficulties unique to that form of communication (see Mousty, Bertelson & D'Alimonte, 1985; Simon & Asensio, 1995; Simon and Huertas, in press), and often few blind people know and use the Braille system (Mack, 1984). In their daily life they use Braille reading only a few times and for very short texts. In fact, only a few visitors read the labels. This is usual in a group visit, where the guide plays the role of the communicative mediator, but it is not the same for individual visitors who do not have other communicative support. In this context blind people prefer verbal sources and the results show that they can use these successfully, probably because they develop very powerful verbal strategies.

In the same way, tactile processing has serious limitations. Touch is serial and does not stimulate holistic images. Strategies for selecting

information are very different with touching compared with sighted exploration. It seems that tactile processing, because it is serial, demands a wider working memory which provokes a deep level of processing. If this is true, we should design materials and communicative strategies that recognize that tactile exploration has more limited processing characteristics. Often hearing stimulation can have more power than touching.

In summary, the most effective information source for blind people is verbal information. Afterwards, blind people seems to create a mental representation of the object, based in tactile index. Therefore, for testing gains in knowledge during museum visits, it is necessary to use both verbal questionnaires and tactile recognition tasks.

On the other hand, when we have evaluated the use of audio and computers for blind people in the museum context, we found that there are many design problems (see also Corvest, 1991). At this moment, new technologies do not help much with these problems. Probably a more careful evaluation of these systems would be useful for designing more effective ways to connect the exhibit with the mind of the visitor, independent of their special needs.

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Table 1
Sample Description

	First Study		Second Study
	Blind	Sighted	Blind
Secondary School	5	21	5
High School	10	24	10
Adults	5	17	5

Table 2
Learning during the visit: Specific Knowledge and Tactile Recognition Task Scores

	Specific Knowledge Task		Tactile Recognition Task	
	Pre	Post	Pre	Post
Secondary School	1.2	1.0	0.3	1
High School	4.3	5.4	1.3	2.3
Adults	9.4	10.8	1.5	2.6

Table 3
Learning during the visit: Tactile Recognition Task Scores

	Just Touch information (Arches)			Touch and Verbal information (Facade)			Just Verbal information (Plans)		
	Pre	Pos	Gain	Pre	Pos	Gain	Pre	Pos	Gain
Sec. School	0	0	0	1	1.5	0.5	0	1.5	1.5
High School	1.5	2	0.5	0.5	2	1.5	2	2.5	0.5
Adults	2	2.6	0.6	1	1.4	0.4	1.6	2.6	1.0
Total	2.5	4.6	1.1*	2.5	4.9	2.4*	3.6	6.6	3.0*

Graph 1
Comparison in the use of the exhibit elements (%)

