Chapter 4: Some Evolving Principles of Visitor Behavior

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Introduction

The original studies of the effects of architecture on visitors were completed in several museums over 50 years ago by Robinson (1928; 1930; 1931; 1933) and Melton (1933; 1935). These landmark studies are the basis of much that we know about visitor behavior in museum and zoo settings. In addition, the number of visitor studies have proliferated in the last decade. A review of the literature from the 1920's until the present (see ILVS Bibliography, 1987), suggests some evolving principles of visitor behavior.

The principles of exhibit design outlined in this paper describe the relationship between visitor behavior and the characteristics of the exhibit environment. The principles are divided into three major areas:

- Exhibit Design Factors
- Visitor Factors
- Architectural Factors

Two points need to be made with respect to these principles. First, these principles are more empirical than theoretical in nature. Other approaches (e.g., Koran et al, 1988) have taken more of a theoretical approach using cognitive constructs. We believe these approaches to understanding visitors are important and not incompatible with our own. The second point is that these principles are tentative. Many argue that they shouldn't be called "principles" because they have not been extensively tested under a variety of conditions. In addition, some of the "principles" described below have more evidence than others. In a recent paper (Bitgood, Patterson, & Benefield, 1988), we described some of these "principles" as "empirical relationships." Whatever we call them, they represent an attempt to provide some order to the growing literature on visitor studies.

Exhibit Design Factors

Size

Our research strongly suggests that larger animals or exhibit objects generate longer viewing times (Bitgood, Patterson, Benefield, and Landers 1986). A Pearson Product-Moment Correlation Coefficient of 0.887 was found between relative size and visitor viewing time. This is ironic since the large animals are not the ones visitors mention as favorite animals. Elephants, rhinos and hippos produce longer viewing times all other factors being equal. (In this study, only the time visitors were standing still was recorded in order to control for the time it takes to walk past a large exhibit.)

This relationship also holds in museums. Bitgood and Patterson (1986) found in a survey of museum visitors, that the most liked and memorable exhibits were also the largest.

Motion

Moving elements in an exhibit or active animals prolong the time that visitors view an exhibit. Melton (1972) found that intermittently running a machine (gear shaper) in a science and industry museum increased the number of visitors who were attracted to the exhibit and also increased the viewing of nearby exhibits. In this case, motion had a generalized effect on nearby motionless exhibits. Bitgood, Patterson, Benefield, and Landers (1986) have found a strong relationship between animal activity and viewing times. Active animals are viewed twice as long as when they are inactive. This relationship held for bears, primates, large cats, pachyderms, hoofed animals and reptiles. Bitgood and Benefield (1986) have found similar relationships between activity and holding power of exhibits across zoos in various parts of the U.S. Martin and O'Reilly (1982) reported that animal activity as well as size, color, and pattern produced longer viewing times in children. Animals' normal activity level is cyclical and they are often least active when the visitors are there. Because of this, other ways of adding motion to exhibits must be used. Koalas are normally inactive, so a videotape showing koalas active in natural settings has been added in the San Francisco exhibit (Linda Taylor, personal communication). Other ways to increase activity include the use of hay in the floor of monkey and

primate cages (Zoo Atlanta), and caging family groups of animals together (when appropriate).

Aesthetic factors

Several investigators (Melton 1972; Martin and O'Reilly, 1982) have suggested that the shape, color, and pattern of an exhibit object or animal may determine the length of time that it is viewed by visitors. There is little evidence for this as yet. One way of determining this would be to compare the viewing times for brightly colored birds with those that are less colorful or zebras with plainer hoofed animals.

Another factor which has been shown to affect visitors is the presence of an infant. Bitgood, Patterson, Benefield, and Landers (1986) reported that adding an infant doubled the normal viewing time for an exhibit.

Novelty or Rarity

Some exhibits are inherently attractive due to their novelty or rarity. Some examples are large jewels, meteorites, white tigers, pandas, and koalas. Visitors to the National Zoo in Washington often stand in line to view the panda which is seldom active. More empirical data is needed to verify these observations.

Sensory factors

Vision is the primary sense used by humans and is the most important sense for exhibits. Several authors have found that exhibits which involve more than one sense produce longer viewing times. Peart (1984) found that exhibits which could be both seen and heard produced longer viewing. Similarly, Koran, Koran, and Longino (1986) found that exhibits which could be both seen and touched produced longer viewing times, even if the visitors didn't touch them! Anecdotal evidence suggests that animals which are noisy in addition to visual produce longer viewing times.

Interactive factors

Interactive exhibits are those in which some action by the visitor produces some reaction from the exhibit object or animal. Melton

(1972) reported increased visitor attention to an electricity exhibit when an interactive element was present. Other examples include interactive computers and staff answering visitors' questions. In zoos, visitors throwing food and the consequent begging by the animals is another example. At the Arizona-Sonora Desert Museum an otter den can be lighted by a pushbutton controlled by visitors. This exhibit produced longer viewing times than similar exhibits without the light (Bitgood and Benefield, 1986).

Triangulation

Triangulation is a concept described by Whyte (1980) in which some person or object promotes interaction between viewers who otherwise wouldn't interact. Whyte described situations such as street performers or sculptures in urban plazas, but museum and zoo visitors are similarly affected by various exhibits or animals that they see. Serrel (1981) demonstrated this effect when new exhibit labels were installed at the Brookfield Zoo. Those exhibits which promote interactions are more likely to educate viewers. Additional data is needed to verify this.

Visitor Factors

Visitor Participation

Visitor participation is another factor that influences viewing time. Screven (1986) has suggested several principles to motivate visitors in informal settings. 1) Exhibits should be more fun when visitors attend and less fun when they don't. 2) There should be a menu of possible circulation routes so visitors can choose what they want to see. 3) Information panels should be independent of one another since visitors don't always read all panels in the correct order. 4) The organization of the exhibits should be transparent so visitors can understand the relationships between exhibits. Martin and O'Reilly (1982) have found that participatory exhibits are particularly popular with children. Koran, Koran and Longino (1986) reported increased viewing time with more opportunity for participation at a museum seashell exhibit. Visitors were timed at the exhibit when the shells were covered, uncovered, and when a microscope was available to examine the shells. Visitors spent the most time at an exhibit when the microscope was available and least time when the shells were covered. Petting zoos for children provide a more direct opportunity for interaction with the animals. Other types of

participation use animal claws or pelts which can be touched or graphics to compare one's height or arm length with that of an animal. Rosenfeld and Terkel (1982) reported on an interactive Mini Zoo that used "zoo games" to teach children about how animals solve the problems of adaptation. Most of the time was spent in areas that allowed the greatest amount of interaction. In recall tests, children generally mentioned the exhibit where they had spent the most time. Even simple displays with questions about an animal and the answers concealed behind a hinged door work well to attract and educate visitors.

Object Satiation

Object satiation and museum fatigue are other factors which affect viewing time. Bitgood, Benefield, Patterson, Lewis and Landers (1985) reported that visitors to a reptile building spent the most time viewing the first exhibits and the least time viewing the later exhibits. This relationship held even when visitors were routed through the building in the reverse direction. Falk, Koran, Dierking, and Dreblow (1985) reported that visitors sharply reduced their attention to exhibits after 30-45 minutes in the museum's exhibit hall. Melton (1935, 1972) described museum fatigue; in galleries with similar exhibits (paintings of a particular style or period) visitors spent decreasing amounts of time the more paintings they observed. The effectiveness of exhibits is decreased when zoos and museums group similar species together. This can be countered somewhat by varying the species; for example, the Birmingham Zoo has constructed a Predator House with displays of cougars, mountain lions, otters, eagles, tigers, foxes and even fish.

Special Interests

Special interests of the visitors affect the attracting power and viewing time of exhibits. Bitgood and Patterson (1986) in a survey of visitors to a natural history museum found a large number of people reported that the birds were their favorite exhibits, an equal number reported birds were their least favorite. This attitude was correlated with whether or not they visited the bird exhibits.

Demographic Factors

Some of the factors which have been shown to affect viewing time are age, gender, socioeconomic/ethnic factors and educational level.

Most zoo and museum visitors are family groups. School groups are the second most frequent category of visitors. In family groups, it is common for the children to be the first to arrive at an exhibit and the first to leave. Children are much less likely to read labels and are more affected by motion (Bitgood, Nichols, Pierce, and Patterson, 1986; Koran, Koran and Longino,1986). Gender appears to affect the preferences and perceptions of different species. Females are less likely to prefer snakes and insects than are males (Patterson and Bitgood, 1985). The most frequently represented socioeconomic groups among zoo visitors are the middle to upper middle class.

Other Psychological Factors

Other psychological factors, such as the visitor's perception of the animal and the perception of the animal in the context of its exhibit, also influence visitor behavior. The more attractive and the more dangerous the species is perceived to be the more likely visitors will stop to view. Bitgood, Patterson and Benefield (1986) found a strong relationship between the ratings of beauty and dangerousness with actual viewing time of a species. Finlay (1986) found that people rated the qualities of animals shown in cages differently from those shown in natural surroundings. Coe (1984), in describing how to design exhibits, has described how the cage affects the visitor's perception of the species. A gorilla behind bars looks like a criminal; the same gorilla in a more naturalistic setting can appear both magnificent and threatening. The more the exhibit implies dangerousness the greater the attracting and holding power.

Visitor comfort is another variable that affects visitors. Visitors stay longer at exhibits that are free of high and low temperatures, rain, wind, and bad odors. Outdoor exhibits that are shaded are more popular in the summer as are air conditioned buildings.

Social psychological variables also control visitor behavior. These include modeling, conformity, friction, and the attracting and repelling power of crowds. Bitgood and Patterson (unpublished) found that visitor feeding at a monkey island tended to occur in clusters. When one person fed the animals several others followed. Conformity also affects the pacing of visitors. Yoshioka (1942) reported that in large crowds at a Worlds Fair building, people conformed to the pace of the crowd. In congested areas of the building friction prevented the visitors from moving as rapidly as they did in less congested areas. Finally, crowds

may either attract or repel visitors from an exhibit. Crowds around one exhibit in an otherwise uncrowded area will often attract more viewers, probably due to curiosity. On the other hand, if the overall area is crowded a particularly crowded exhibit may be avoided.

Architectural Factors

Visibility

The visibility of an exhibit is affected by various factors such as the lighting, visual obstacles, barriers and glare. The more visible the animal or object, the longer visitors will view it. Bitgood, Pierce, Nichols and Patterson (1987) have shown that increased lighting levels in a simulated cave exhibit increased viewing time and the reported satisfaction with the exhibit. While it is important to maintain a dimmed environment for the sake of realism, it is unreasonable to expect visitors to wait very long for their eyes to dark adapt to be able to see in such an exhibit. These same comments would apply to the display of nocturnal animals which are often in darkened environments. Designing a sequence of progressively darker exhibits would alleviate this problem. Obstacles such as hedges, fences, rocks, and vegetation can also obstruct the view of an animal. One common problem in many exhibits is that children must be lifted up to be able to see. Martin and O'Reilly (1982) have suggested that exhibits should be planned to accommodate the smaller stature of children. Visual barriers such as bars, chain link fences, wire and glare on glass also obstruct the view of the animals or objects on display, reducing viewing times. Bitgood, Patterson and Benefield (1986) have documented that visual barriers do reduce viewing time and visitor satisfaction with the exhibit. Glass angled to prevent glare, thin vertical wires or moats seem to provide the best viewing.

Proximity of animal/object

Bitgood , Patterson, and Benefield (1986) have shown that the closer the animal is to the visitor the longer the viewing time. In a kudu cage, in which the animal could move from the fence next to the visitor, up to 100 feet away, visitor viewing times were proportional to the distance from the visitor. Martin and O'Reilly (1982) have suggested the use of multiple viewing points to allow visitors to get closer to animals in large cages.

Realism of exhibit area

In a zoo or museum setting the perception of realism contributes to the effectiveness of the display in two ways. First, naturalistic habitats allow the full range of normal behaviors of an animal to occur. Second, visitors learn more about an animal when it is seen in the context of its natural habitat. Because of practical considerations zoos and museums often must use artificial rocks, streams and sometimes even vegetation, therefore creating the perception of realism. Coe (1985) has argued that sterile environments evoke aberrant and unnatural behaviors from animals who have nothing to do. Clarke, Juno and Maple (1982) have shown a marked decrease in stereotyped and self directed behaviors when animals were moved to a naturalistic environment. Sterile exhibits cause visitors to react with disgust or pity for the animals. But a naturalistic exhibit that provides the animal an opportunity for normal behavior can evoke admiration and concern for the preservation of the species. Coe has also suggested that naturalistic exhibits will hold the visitors' attention even when the animal is inactive. In the same article he described "landscape immersion" in which entire areas of the zoo are landscaped to match the animal exhibit. In this way visitors feel more like they are in an African Savannah rather than in a park looking at a savannah. This intensifies the zoo experience by making the visitors feel they are in the animals' habitat rather than the animals being in a human habitat. Another design principle Coe discussed was the relative position of the viewer to the animal. If the visitor looks down at the animal this implies dominance over the animal. But when a wild animal looks down on the visitor, the visitor is in a subordinate position where respect and even mild apprehension may result. This is more likely to be a memorable experience for the viewer, and it leaves the viewer with a more appropriate attitude toward wildlife.

Finlay (1986) used a semantic differential to assess attitudes toward animals. Viewers were shown slides of animals in either a wild or zoo environment and asked to rate them on 11 pairs of adjectives. He found that the environment did significantly affect the ratings of the animals.

Sensory competition

Extra exhibit stimuli compete for the attention of the visitor. If two exhibits can be viewed at the same time, the less attractive exhibit is often skipped. Yoshioka (1942) found, in a study at a World's Fair, that visitors were attracted by large, colorful exhibits and bypassed more

mundane exhibits nearby. Melton (1933) found that the more paintings assembled in a gallery the less time each one was viewed. Every object in a gallery competes with every other object for the viewers' attention. Melton (1936) found that running a gear shaping machine increased viewing time for that machine and others in the immediate vicinity, but decreased viewing time for previously popular exhibits. Bitgood, Patterson, and Benefield (1986) found in a predator house that when two exhibits were opposite each other in a hallway, visitors often viewed one of the exhibits and not the other. Thus, the attracting power (percentage of visitors stopping) was lower when two exhibits competed with each other on opposite sides of the exhibit hallway than when only one exhibit could be viewed at a time.

Summary

We offer the evolving principles in this paper as a catalyst for further research and thought. We expect the formulation of these empirical relationships to be refined and perhaps restructured in the next several years. If they prove useful to understanding visitor behavior, we will be pleased. If they help stimualate additional interest in research and theory development, even better. It is our belief that we need to pull together the visitor studies literature and put it into some type of theoretical order. This paper is a primitative attempt to begin this effort.

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Footnote

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