

The Effects of Visitor Perceptions of Museums and Task Preference on Learning from Museum Exhibits

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Exhibits are designed with the goal that visitors will learn from their experience, examine their feelings, and be motivated to change their behavior. As evaluators, our charge is to determine if exhibits effectively meets these goals.

Because attention is the first step in learning from an exhibit, a large number of studies on learning in informal settings have been carried out to determine the exhibit characteristics that maximize visitors' attention (Bitgood & Benefield, 1987; Koran, Longino & Shafer, 1983). Researchers have examined the effects of visual attractiveness, label length, and illumination intensity on the attracting and holding power of exhibits (Falk, Koran, Dierking, & Dreblow, 1985). Findings from this research have clearly demonstrated that manipulation of exhibit characteristics can bring an increase in attracting and holding power. However, exhibit holding power is rarely increased to a level where visitors attend to exhibits long enough to read all textual material (Bitgood, Pierce, Nichols, & Patterson, 1987; Peart 1984, Serrell, 1981). The relatively low exhibit holding powers reported in these studies, independent of exhibit characteristics, make it difficult to infer that significant learning has occurred. When measures of achievement are included in research, increased attracting and holding do not predictably result in increased learning (Bitgood et al, 1987; Peart, 1984).

Many researchers working with exhibit attracting and holding power assume that success or failure, in terms of visitor achievement, is a function of the exhibit itself. Salomon (1983), however, argues that the nature of an information source, such as its complexity, novelty, structure, and pace, interact with learners' abilities only to a certain extent when considering what the individual learns from that source. Salomon proposes that the critical factor in determining how much an individual learns is the amount of effort the individual consciously decides to devote to comprehending and learning.

The amount of effort an individual invests in learning is a decision made by the individual based on two key factors: perceived demands of an information source, and perceived self-efficacy. Perceived self-efficacy refers to the subjective judgments an individual makes concerning her/his ability

to succeed at a task. The more a learner believes in her/his ability to succeed at a task, the more likely the individual is to invest and sustain effort in comprehension and learning. The perceived demands of an information source are based on (a) what an individual needs to do in order to comprehend the information source (read, listen, observe, etc); (b) media attributes (depth, complexity, importance); (c) tasks to be performed (read only, take notes, problem solve, etc.); and (d) contexts in which one is exposed. Salomon found that when individuals perceived an information source as entertaining, fun, easy, or unrealistic they were less likely to invest substantial mental effort. Conversely, individuals who perceived an information source or task as serious, valid, or difficult were more likely to invest a greater amount of mental effort. Increasing the amount of effort invested in a task is likely to result in increased learning.

Most visitors view informal learning centers more as entertainment than as a learning experience (Cheek, 1976; Kellert, 1979; Kimche, 1978; Their, 1984). Given that visitors perceive informal learning centers as fun and entertaining, it could be predicted that very little effort would be invested in learning at informal settings, and subsequently, very little would be learned. This would imply that changing visitors' perceptions of informal learning centers may ultimately be more productive than altering exhibits. One objective of the study described here was to examine the relationship between the perceived demand characteristics of museums, and learning from museum exhibits.

Research involving college students' academic success suggests that an individual's task preference has a profound effect on learning in informal settings. Task preference is a measure of an individual's preference to learn independently of externally-set tasks. Domino (1968) found a strong relationship between college students' scores on a measure of conformity, and their level of academic achievement. Individuals who placed themselves at the conformity end of a continuum performed optimally in classes typified by clearly defined assignments, rare use of visual aids, and close harmony between text and lecture. These classes typically rewarded conforming behavior such as acceptance of regulations, and a high degree of self-discipline, efficiency, and responsibility. Individuals who placed themselves at the independence end of the continuum performed optimally in classes typified by a variety of presentation types, assignments that called for divergent thinking, and little overlap between text and discussion. These classes typically rewarded individuality, self-reliance, and creative innovation.

Domino's environment that rewarded independent behavior included many characteristics that define informal learning settings (described by Koran, Longino, & Shafer [1983]). As preference to work on internally-set tasks increases, one would predict an increase in learning success in informal settings that lack externally-set task instruction. Conversely, as the preference to work on externally-set tasks increases, one would predict

decreasing success in informal learning settings characterized by the absence of specific task parameters. In light of research on task preference, one purpose of this study was to examine the effect of providing, or not providing, museum visitors with specific tasks for learning, in relationship to the visitor's task preference.

Methods

This study was carried out at the Florida Museum of Natural History and made use of 11 static case exhibits, all of which addressed an aspect of Florida vertebrate or invertebrate biology. One hundred sixty-nine college undergraduates enrolled in education courses at the University of Florida were randomly assigned to one of four treatment groups: Look, Interest, Mainpoint, and Text. Subjects in three of the treatment groups (Look, Interest, and Mainpoint) viewed the 11 case exhibits. Subjects in the Look treatment group were asked to view the exhibits with the same mindset as if they had chosen to come to the museum during their own free time. Subjects in the Interest treatment group were asked to write down one interesting thing about each of the 11 exhibits. Subjects in the Mainpoint treatment group were asked to summarize the main point or points of each exhibit. Subjects in the fourth treatment group (Text treatment group) did not view the exhibits, but read a written transcript of the 11 exhibits. This treatment group was included to allow comparison of invested effort and achievement of individuals who were exposed to the same content but in different contexts.

Prior to visiting the museum, all subjects completed a survey which measured their perceptions of museums as demanding. This instrument, based on Salomon's work, called for subjects to rate the difficulty of learning from museums in contrast to a book, their perceived self-efficacy regarding learning in informal settings, and their perceptions of a museum visit as fun and entertaining (.76 reliability, Spearman Brown Prophecy). Subjects were not aware of which exhibits had been incorporated into the study, what the experimental treatments entailed, or the fact that they would be tested on exhibit content following completion of the treatment.

Upon completing the treatment subjects again completed the museum perceptions survey. They were then asked to rate the perceived difficulty of the assigned task they carried out and how much effort they had put into it. Finally they were given a test covering exhibit content. This test contained 29 recall and recognition items, and 8 synthesis and application questions (.79 reliability, Coefficient Alpha). Subject task preference was measured by having students place themselves on a 15 point scale where 1 equaled "I do my best work when I am meeting requirements set for me," and 15 equaled "I do my best work when I can set tasks for myself."

All analyses of main effects, treatment effects and aptitude-treatment interactions were carried out using multiple regression analyses tested at the .05 level.

Results and Discussion

Salomon hypothesized that information sources which were perceived as more demanding would receive increased effort in comprehension. In this study, however, there was a strong negative relationship between how demanding museums were perceived to be, and the amount of effort subjects reported investing in learning $F(7,141)=3.45, p<.005$. There were two significant interactions between subjects' perceptions of museums and the amount of effort they reported in comprehension. This relationship is illustrated in Figure 1. As museums were perceived as increasingly demanding, subjects in all treatment groups invested less, rather than more, effort in comprehension for all treatment groups. However, the relationship between perceptions of museums as demanding, and invested effort approached zero for the Text and Interest treatment groups. As perceptions of difficulty increased among subjects in the Look and Mainpoint treatment groups increased, they invested less effort. These findings are in sharp contrast to those predicted by Salomon.

I believe the difference between my findings regarding subjects in the Mainpoint and Look treatment groups and Salomon's findings is a function of individual motivation to attend to an exhibit, and the relationship between interest and effort. Salomon's hypothesis hinges upon the assumption that individuals are motivated to invest effort in order to learn from these demanding information sources. This hypothesis is supported by findings from studies in highly controlled settings where subjects had the content and the time spent dealing with the content prescribed for them—their only task was to attend to the information presented.

In this study, however, there was no external motivation to invest effort in learning from the exhibits, as subjects were not aware that they would be given a posttest covering exhibit content. In the absence of external motivation to learn from the exhibits, the behavior of subjects in this study may have been more similar to casual visitors. Visitors to informal learning centers arrive with goals other than learning (Hood, 1988). Investing too much effort in comprehension may conflict with these goals. Because of this conflict, visitors may arrive with a predetermined amount of effort that they wish to invest in learning from exhibits. Also, visitors to informal learning centers are not required to attend to each exhibit. Instead, attention is determined on an exhibit-by-exhibit basis, depending on visitor interests and goals. Additionally, when visitors do attend to an exhibit, attention cannot be equated with a concerted effort to comprehend the information presented in the exhibit.

Interest-driven attention patterns and goal conflicts would interfere with the relationship between perception of museums and effort invested in comprehension. If an individual, after scanning an exhibit, is not interested, she/he will not be motivated to invest effort, regardless of how demanding the exhibit is perceived. Encountering an exhibit that requires more effort than the visitor is willing to invest may result in the visitor simply bypassing the exhibit. If the number of exhibits that are bypassed, because they are considered too demanding, increases as the perception of museums as demanding increases, then the relationship between the perceived demands of museums, and effort expended, would be negative rather than positive. The relationship between perceived demand characteristics of museums and the amount of effort subjects in the Look and Mainpoint treatment groups reported investing matches this scenario.

The effect of visitor interest on the amount of effort required to comprehend an information source may exacerbate the negative relationship, noted in this study, between the perceptions of museums and effort invested in carrying out the task. Shirey and Reynolds (1988) found that when readers were not given specific goals for their reading, they tended to focus on information they found interesting, independent of its importance to the overall theme of the text. They also found that interesting information required less effort to learn. If the relationship that Shirey and Reynolds noted between interest and effort holds true for museum visitors, then museum visitors are spending the most time at exhibits that demand the least amount of effort to comprehend.

If the exhibit was found to be interesting, but still required more effort than the visitor was willing to invest, she/he would not necessarily bypass the exhibit. Instead the visitor may simply invest a predetermined amount of effort, or avoid the mentally demanding portion of the exhibit. In this case, if the majority of the exhibits were perceived to be interesting, but overall too demanding, then visitors would invest the same amount of effort in all of the exhibits, independent of the perceived demands of a museum. This scenario matches findings regarding the relationship between perceptions of museums as demanding, and effort invested for subjects in the Interest treatment group. Examination of subjects' written reports of what they found interesting in each exhibit revealed that these individuals were most often attending to superficial features of the objects in the case that were not necessarily related to the exhibit topic ("I thought it was sad how the birds had cotton for eyes," "I didn't know a frog could be that small!").

In this study, subjects in the Interest treatment group were given a task that called for a minimal amount of invested effort. Given the relative ease of the task, and the aforementioned relationship between interest and effort, one would not expect a strong relationship between museum demand characteristics and effort. This is supported by findings from this study. Subjects in the Mainpoint and Look treatment groups, however, showed a strong negative relationship between how difficult they perceived museums

to be and how much effort they invested in comprehension. In contrast to subjects in the Interest treatment group, subjects in the Look and Mainpoint treatment groups were not explicitly instructed to search for information they found interesting. In turn, they invested a decreasing amount of effort as museums were perceived to be increasingly difficult. Given the relative difficulty of the task and in the absence of external motivation, these subjects may have been increasingly reluctant to invest effort in the task as their perceptions of museums as demanding increased.

Salomon postulated that increased effort resulted in increased learning. In this study, perceived demand characteristics and effort were neither directly nor indirectly related to learning. Because Shirey and Reynolds equated increased time spent on task with increased effort, an analysis was carried out to determine if a positive relationship existed between museum demand characteristics and time. There was, however, no significant positive relationship between the perceived museum demand characteristics and time on task. Findings from this study do not support Salomon's arguments that perceptions of an information source account for the largest portion of the variance in learning. Given a free-choice, non-evaluative environment, the amount of effort a visitor invests in learning from an exhibit may be determined on an exhibit-by-exhibit basis. Furthermore, the total amount of mental effort invested may be limited by visitor interests or goals for visiting an informal learning center.

Learner task preference, however, was found to have a significant effect on learning in a museum setting $F(7,154)=2.064, p<.05$. It was hypothesized that individuals who prefer working on tasks set for them would benefit from explicit task instruction. Conversely, individuals who prefer working on tasks they set for themselves would benefit from the absence of specific instructions. Findings from this study regarding scores on the recall and recognition questions support this hypothesis. The relationship between subject task preference and scores on the recall and recognition questions is represented in Figure 2. The interaction between learner task preference and achievement was significant for subjects in the Mainpoint treatment group ($t=2.265, p<.02$). As individuals in this group that were asked to summarize the main points of each exhibit increasingly preferred to work on internally set tasks, scores on the recall and recognition test decreased significantly. There was no significant relationship between learner task preference, and achievement, in any other treatment group.

Findings from this study present some important implications for learning in informal settings, and for future research. The perceived difficulty of an informal learning center may be very useful in determining why an individual chooses to attend or not attend the center. If the visitor thinks he or she must expend a great deal of effort to make the visit meaningful, these settings may be bypassed all together. Future research concerning individuals' perceptions of informal learning environments should examine

the relationship between perceptions of informal learning environments, visitor goals, and the probability of visiting.

It would be interesting to investigate how visitors evaluate exhibits to determine the amount of effort they need to invest. For example, does small print size on a label result in low holding power simply because of the difficulty in reading the text, or do visitors believe that "fine print" can be equated with difficulty in comprehension?

It would be important to determine the relationship between interest, effort, and learning as applied to informal settings. If the relationship noted with text can be generalized to exhibits, then those exhibits deemed interesting would be both most attended to and most easily comprehended. Given the idiosyncratic nature of what visitors believe to be interesting, it may be best to repeat themes or messages across a number of exhibits. A certain amount of redundancy in message, presented in novel ways, may be beneficial.

Finally, this study's findings concerning task preference have clear implications for designing exhibits and programs. If visitors in informal learning centers vary in their preference for clearly set, predescribed tasks, then exhibit design should reflect this variation. Providing clear, explicitly stated goals and questions within each interpretive exhibit might be beneficial, as might exhibit orientation devices or brochures that set goals for a visit.

In conclusion, the findings from this study emphasize the unique nature of the informal learning setting. They also underline the importance of considering visitor interests, preferences and perceptions when designing exhibits and programs, and understanding the intended audience when designing and evaluating exhibits.

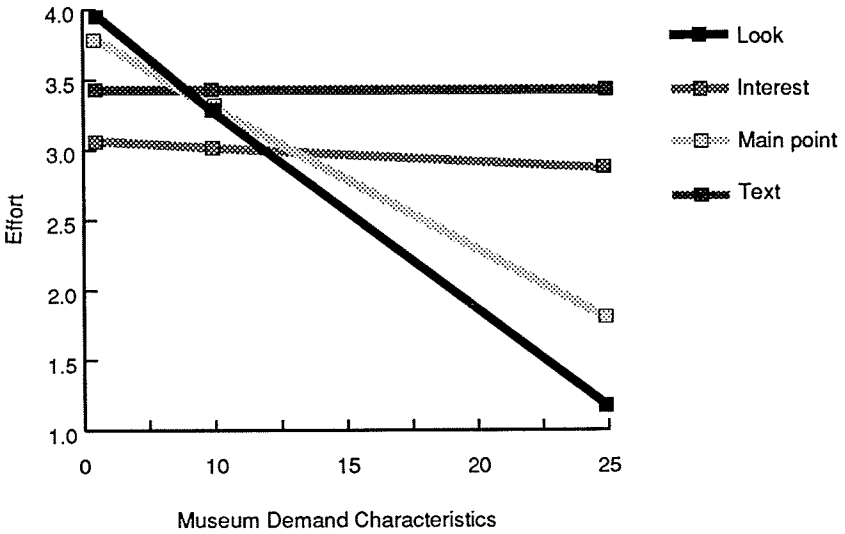
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Figure 1

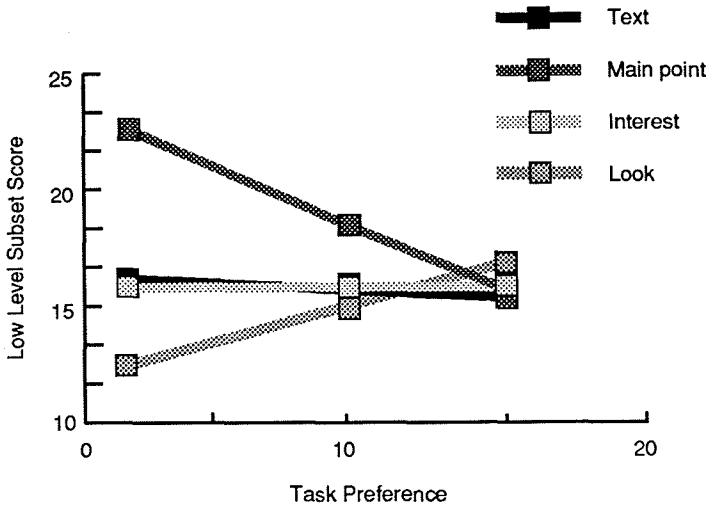
Interaction Between Museum Demand Characteristics and Subject Reports of Effort Expended*



*The higher the score, the more museums are perceived as difficult, or more effort is reported expended on task

Figure 2

The Interaction Between Task Preference* and Treatment on Low Level Subtest



*The higher the score the greater the preference to work on internally set tasks