

Research Question: Does written orientation increase learning behaviors in the Forensic Anthropology Lab?

Abstract

This quasi-experimental study focused on the impact of an orientation on the learning behaviors of visitors to the Forensic Anthropology Lab (FAL) at the Smithsonian's National Museum of Natural History (NMNH). The research identified 6 learning behaviors based on a literature review and observations of visitors in the FAL. We measured the impact of orientation on the frequency of behaviors through systematic coding of observed behaviors for $N = 94$ visitors and systematic interviews of $N = 23$ visitors.

Results indicate that orienting mechanisms like text-based signage can have a significant impact on visitors' learning behaviors. When visitors read a written orientation prior to their entry into the FAL, they engaged in significantly more hands-on activity at learning stations; talked with each other more often; and read instructions more frequently. Staff in the lab also talked less frequently with visitors when the orientation sign was available. The results suggest that written orientation is a valuable tool for museum staff to help visitors use their limited time more efficiently for learning museum content.

Background and Hypothesis

For this study, we defined learning as acquiring knowledge and skills through specific behaviors, including touching objects and tools, using tools and resources, and talking with other people, including staff and visitors (Barriault, 1999; Diamond, 1999). These behaviors can help learners to discover new content through multiple channels (e.g., talk, touch) and make meaning by connecting what they learn to their own lives (cf., National Research Council, 2010).

Orientation to a new learning environment can significantly increase the extent to which people pay attention to new information (Falk & Dierking, 2000). In exhibitions, a sign that simply identifies the content that multiple exhibits address can significantly increase visitors' understanding of that content (Falk, 1997). The literature review did not reveal any studies that explored whether or not orientation through signs could lead to an increase in learning behaviors.

Hypothesis: Visitors to the FAL who see an orientation sign will exhibit more learning behaviors than those who do not.

Methods

The research was conducted in the Forensic Anthropology Lab (FAL) at the Smithsonian's National Museum of Natural History. A quasi-experimental research design was used, with control $n = 62$ and treatment group $n = 32$. Interviews were conducted ($n = 23$) to validate observations.

- FAL visitors above age 10 were systematically selected for observation upon entry into the FAL.
- Selected visitors were observed during their entire FAL visit, with behavior occurrence and duration tracked using a coding sheet designed for this study
- The treatment group was provided with a 31-word sign (orientation) placed on an easel positioned outside the FAL

Results

Data were analyzed using an independent samples t -test for differences in mean numbers of behaviors between the control and treatment conditions. The analysis partially supported the research hypotheses, with significant differences between conditions found for six observed behaviors:

- **Visitors held objects** in the treatment condition significantly more than visitors in the control condition, $t(92) = -2.084, p < .05$.
- **Staff touched lab objects** in the treatment condition significantly less than staff in the control condition, $t(92) = 3.490, p < .05$.
- **Visitors talked to staff** in the treatment condition significantly less than visitors in the control condition, $t(78) = 3.111, p < .05$.
- **Visitors talked with each other** in the treatment significantly more than in the control condition, $t(45) = -2.395, p < .05$.
- **Staff talked** significantly less to visitors in the treatment condition than to visitors in the control condition, $t(91) = 3.192, p < .05$.
- **Visitors read significantly more labels** in the treatment condition than visitors in the control condition, $t(35) = -2.185, p < .05$.

Table 1. Means and standard deviations for occurrences of 13 visitor behaviors per station in the treatment and control conditions.

Behavior	M (SD)		t
	Control	Treatment	
Visitor Holding Object	0.65 (0.807)	1.12 (1.351)	-2.084*
Visitor Touching Object	0.85 (1.212)	0.91 (0.812)	-0.257
Visitor Touching Resource	0.16 (0.232)	0.22 (0.394)	-0.796
Visitor Touching Tool	0.07 (0.282)	0.02 (0.059)	1.039
Visitor Talking to Visitor	1.33 (1.483)	2.38 (2.255)	-2.395*
Visitor Talking to Staff	1.19 (1.904)	0.38 (0.535)	3.111*
Visitor Comparing Objects	0.09 (0.204)	0.17 (0.261)	-1.666
Visitor Using Tools	0.03 (0.081)	0.05 (0.146)	-0.905
Visitor Reading Label	0.05 (0.110)	0.17 (0.313)	-2.185*
Visitor Reading Resource	0.28 (0.390)	0.51 (0.714)	-1.685
Staff Talking	3.63 (3.603)	1.75 (2.099)	3.192*
Staff Touching Object	1.53 (1.561)	0.67 (0.829)	3.490*
Visitor Touching Resource	0.16 (0.232)	0.22 (0.394)	-0.796

Figure 1. Mean number of talking behaviors per station in treatment and control conditions.

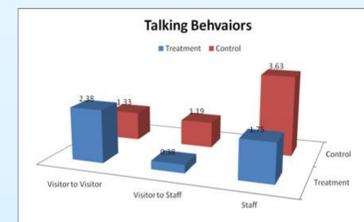


Figure 2. Mean number of object touches per station in treatment and control conditions.

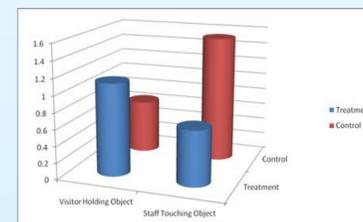
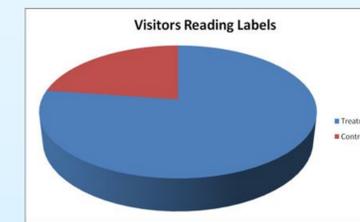


Figure 3. Mean number of times visitors read labels per station in treatment and control conditions.



Learning in the Forensic Anthropology Lab

The Forensic Anthropology Lab (FAL) is a hands-on learning lab that allows visitors to solve realistic forensic mystery cases based on those that the museum's research staff has studied. Cases can be solved within the lab, involving activities that require the tools and techniques that forensic anthropologists use to draw conclusions. The lab contains 10 different stations used by visitors to identify and gather key information to help solve the overall case. The recorded stations were as followed; 1.) Pathology, 2.) Height, 3.) Sex, 4.) Historical Context I, 5.) Historical Context II, 6.) Age, 7.) X-Ray & Computer Monitor, 8.) Skeleton Assembly Map, 9.) Lab Entrance Counter, 10.) Back Counter, and Other.

Figure 4. FAL entrance door with the written orientation sign



Figure 5. Sample instructional label which instructs FAL visitors



Figure 6. View of the FAL setting from the visitor and observer's view



Photo credit: David Price

Conclusions

The data gathered from this study partially support the research hypothesis which is that visitors to the Forensic Anthropology Lab will engage in more learning behaviors when they receive a written orientation to the activities. Treatment visitors displayed more learning behaviors than did visitors in the control group. The written orientation increased the number of times visitors held objects, visitors talked to other visitors, and visitors read labels, while reducing the amount of talking to staff, how much staff touched objects, and staff talked in general. The study however, shows no significant difference in the amount of time spent in the lab by FAL visitors in either of the treatment or control groups.

This suggests that visitors who received an orientation were more efficient with their time while in the lab than control group visitors who spent longer periods of time and displayed fewer learning behaviors. This information will be used by museum staff to develop approaches to learning activities that balance the use of objects, staff interactions, and carefully selected instructional signage to help visitors maximize their time to learn important content and gain science skills during their experiences.

Discussion

The results suggest that visitors are active participants and do acquire some knowledge while working on the cases in the FAL setting. One of the goals of this study was to determine whether or not a written orientation has any impact on visitors' learning experiences in the lab. Ideally, the FAL is designed to empower visitors to take an active role in their own learning experience within the museum and to ask questions of the interpretive staff. The data analyses showed, however, that without the written orientation, observed visitors often experienced lecture-styled dialogue from staff which may have played a major limiting factor as to the decreased amount of times visitors displayed the following behaviors; visitor holding object, visitor talking to other visitor, and visitor reading label.

Further questions I would like to pursue are: What impact does a video orientation have on visitor learning in museums? What impact do crowds have on visitor learning within informal settings? How does the arrangement of artifacts and physical layout of informal science settings effect visitors' learning experiences in museums? And what role(s) do parents play in the learning experiences of adolescents within museums?

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Photo credit: David Price

Smithsonian Women's Committee

