

Evaluating Exhibits that Promote Conservation Behavior:

Developing a Theoretical Framework

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ABSTRACT

Using criteria drawn from environmental education and environmental psychology literature, a framework is developed for evaluating exhibits that intend to promote environmentally responsible behavior. As part of a larger study, this framework is applied to the “Bog of Habits” exhibit at the Brookfield Zoo. A group of evaluators conducts independent analyses of the exhibit and provides recommendations for improvement. Results from a content analysis of the evaluators’ comments indicates that the exhibit provides visitors with pertinent information about daily choices and can foster group discussions about the environment, but is not as strong in terms of motivating or encouraging visitors to participate in environmentally-friendly behaviors.

The findings have implications for designing future exhibits in non-formal education settings that strive to promote conservation behavior. Equally important, the framework could be adapted for use by other evaluators in the field.

INTRODUCTION

Environmental educators have tackled the goal of responsible environmental behavior in citizens from a number of different angles. In the area of non-formal education, institutions such as zoos and aquaria are beginning to use exhibits as behavior change interventions. The potential for zoos to positively influence their visitors’ conservation knowledge, attitudes, affect, and behaviors has been widely documented (AZA in press). As such, the Brookfield Zoo has developed exhibits to motivate their visitors to lead more ecologically benign lifestyles.

However, because the potential for zoos to positively influence visitors has not been validated through empirical research, there is a need to know how to evaluate such exhibits.

At the Brookfield Zoo, the Quest to Save the Earth is an outdoor exhibit that serves as the exit experience for the Zoo's primate house. Designed as an interactive game for family groups, the Quest encourages visitors to explore and adopt new environmental behaviors through a series of four challenges. The first of these challenges, the Bog of Habits, addresses the daily choices individuals make and the affect of these choices on the environment. Visitors can cross the Bog of Habits, a recycled rubber surface, by stepping on a series of stones. Each stone is inscribed with a different behavior, and with the assistance of a guidebook and a spinner, visitors learn about the possible impacts their choices can have on the environment (Brookfield Zoo 1997).

Research in the field of environmental education suggests that there are many precursors to environmentally responsible behavior. To address the heightened interest in the efficacy of zoos in providing conservation knowledge and encouraging the adoption of conservation behaviors, researchers at the University of Michigan conducted an evaluation of the Bog of Habits exhibit to determine the exhibit's effectiveness in promoting environmentally responsible behaviors. This study introduces and tests a framework that can be used 1) to evaluate an exhibit's effectiveness in promoting environmentally responsible behaviors and 2) to develop future behavior change exhibits.

METHODS

Evaluation Guidelines

Evaluation guidelines were developed from environmental psychology and environmental education literature (for examples, see Hungerford and Volk 1990, Kaplan and

Kaplan 1983, and NAAEE 1996), as well as the objectives of the Quest to Save the Earth (Brookfield Zoo 1997). The guidelines were broken into six categories:

1. Information - to introduce visitors to environmental issues and behaviors;
2. Presentation - to expose visitors to concepts in a manner sensitive to their needs;
3. Engagement - to help visitors feel excited about and interested in conservation behaviors;
4. Motivation - to develop visitors' senses of responsibility to take environmental action;
5. Participation - to offer visitors opportunities to physically and cognitively explore environmental behaviors; and
6. Physical Space - to provide visitors with an environment conducive for family interactions and learning.

The evaluation guidelines were written in a format similar to the one used in the North American Association for Environmental Education *Environmental Education Materials: Guidelines for Excellence* (1996). First, the overall guideline is presented, followed by individual criterion. A series of questions indicate ways for evaluators to gauge how well each guideline is met.

Evaluation

Evaluators were students at the University of Michigan who volunteered their time and expertise. As a pre-requisite to participation, the evaluators had completed or were enrolled in conservation behavior or environmental education courses through the School of Natural Resources and Environment. Using a matrix adapted for this study, the evaluators rated the game with the scale 1-5 (1=does not meet any of the criteria, 5=meets all of the criteria). Then they were asked to comment on the strengths of the exhibit in reference to each criterion, in addition to any recommendations for improvement. Lastly, the matrix included a “new rating” column. This column was intended for the evaluators to imagine their recommendations were made – how would they rate the exhibit then? The purpose of this new rating was to normalize the original ratings by seeing how high each guideline could score.

Prior to the evaluation, all of the evaluators attended a training session. This training session allowed evaluators to go over the criteria and mimic the evaluation they were to conduct

a few days later. The evaluators pre-tested the evaluation matrix at another conservation-oriented exhibit at the Brookfield Zoo.

ANALYSIS

While the data was predominately qualitative, it also included components that were analyzed quantitatively. Means and standard deviations were determined for each category in the Bog of Habits matrix.

Content analysis was used to distill the written comments in the evaluation matrices. The evaluation comments from the Bog of Habits challenge were used to generate a list of ideas mentioned three or more times in the strengths and recommendations columns. Coding categories (Babbie 2002), consisting of the words and/or phrases associated with each concept, were determined for the six guidelines.

RESULTS

Rating Scores

Rated on a scale of 1-5 (1 = does not meet any of the criteria to 5 = meets all of the criteria), the strongest category for Bog of Habits was Information. Additionally, Information was the only category that received a perfect score of 5 if the recommendations were implemented. Other categories that scored high were Presentation and Engagement. The mean rating scores show that the Bog of Habits exhibit meets at least half of the criteria for the remaining categories of Motivation, Participation, and Physical Space (see Table 1).

Strengths

Analysis of the evaluator's comments of the Bog of Habits reveals the following strengths: utilization of familiar and unfamiliar behaviors, positively framed messages, and a unique interactive opportunity for visitors that can be different upon repeated visits. This last

point is an important finding because members of the Brookfield Zoo often return and play the Bog of Habits. The Bog of Habits also motivates visitors who are playing the game with congratulations and rewards in a manner that is engaging and vivid. Additionally, evaluators emphasized how the exhibit is designed with environmentally friendly materials, such as recycled rubber tires, which makes the exhibit consistent with messages contained in the exhibit.

Recommendations

Along with these strengths, evaluators found areas for improvement. They commented in the Participation and Physical Space categories that there were limited opportunities for reflection and that directions were not clear or visible. Evaluators also noted that playing the game requires visitors to have reading skills and to be at a certain age level and that playing it to completion could be too time consuming. Although evaluators highlighted areas needing improvement, suggestions for how to implement these recommendations were not always provided.

DISCUSSION

The Bog of Habits fosters behavior change as it successfully incorporates both familiar and unfamiliar behaviors. By including familiar behaviors, a sense of competence is created as visitors are presented with things they are likely already comfortable doing. When people feel a sense of competence, they will be more inclined to try new and unfamiliar behaviors. Including both declarative and procedural knowledge in the exhibit is another key strength, since both types of knowledge provides visitors with an opportunity to not only learn about environmental issues and why they should be addressed, but also how to address these issues. This can motivate visitors to adopt environmentally responsible behaviors as it reduces their sense of helplessness about knowing why and how to help the Earth.

Positively framing messages is important as it could lead visitors to develop a positive attitude about helping the Earth and environmental behaviors. This could then lead visitors to try new behaviors. Allowing visitors to interact with others is key in a behavior change exhibit because exhibits that allow visitors to actively participate physically and cognitively are more effective at increasing interest and remaining salient in visitors' minds (Kaplan and Kaplan 1983). Finally, repeat exposure to messages helps to foster behavior change as it creates a sense of familiarity with the new ideas and behaviors within the exhibit. Environmental education and environmental psychology literature indicate that these features are needed to affect behavior change in individuals.

CONCLUSIONS

This framework allowed evaluators to assess the strengths of an exhibit not only from an environmental education viewpoint, but also considering principles from environmental psychology. The results of this framework were used to inform a larger study of the Bog of Habits (Dotzour et. al 2002). It gave greater depth to a standard survey-based evaluation and provided theoretical explanations for the results found through the surveys.

In the future, this framework can be used both to design as well as to evaluate environmental education exhibits. If a museum or education center attempts to replicate this exhibit at their site, care must be taken to ensure that the messages correlate to other exhibits. Other sites interested in this exhibit should also ensure that the behaviors contained within are relevant to their visitors' lives. Lastly, positive framing should be employed to help visitors feel as though they can take part and make a difference in helping the Earth.

REFERENCES

- American Zoo and Aquarium Association. (In press). Multi-institutional research project literature review. *Institute for Learning Innovation*, Annapolis, MD.
- Babbie, E. (2002). Coding in content analysis. Pages 317-318 in *The Basics of Social Research (Second Edition)*. Belmont, CA: Wadsworth.
- Brookfield Zoo. (1997). *Quest to Save the Earth Final Interpretive Plan/Text Package*.
- Dotzour, A., C. Houston, G. Manubay, K. Schulz, and J.C. Smith. (2002). Crossing the Bog of Habits: An evaluation of an exhibit's effectiveness in promoting environmentally responsible behaviors. Unpublished master's project thesis, University of Michigan.
- Hungerford, H. and T. Volk. (1990). Changing learner behavior through environmental education. *Journal of Environmental Education*, 21(3), 8-22.
- Kaplan, S and R. Kaplan. (1983). *Cognition and Environment: Functioning in an uncertain world*. New York: Praeger. (Republished by Ann Arbor, MI: Ulrich's, 1989).
- North American Association for Environmental Education. (1996). *Environmental education materials: Guidelines for excellence*. Troy, OH.

