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Value of Guest Interaction in Touch Pools at Public Aquariums

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Abstract The purpose of this study was to demonstrate the effectiveness of interactive exhibits at instilling conservation behaviors and appreciation towards wildlife. Aquarium visitors completed a survey prior to visiting an interactive exhibit that allowed them to touch aquatic invertebrate species. After visiting the exhibit, participants were asked to complete another survey. Comparison of pre- and post-test measures revealed that the aquatic interaction increased how knowledgeable individuals felt about aquatic wildlife (Cohen's d=0.52, $p<0.001$) and the likelihood that participants felt they would take action to protect aquatic wildlife (d=0.60, $p<0.001$). The aquatic interaction, however, had only a small effect on how much participants valued aquatic wildlife (d=0.20, NS) and virtually no effect on how strongly participants felt about the importance of protecting aquatic wildlife (d=0.01, NS). The study also demonstrated that visitors who had prior interactive experiences with zoo or aquarium animals indicated higher knowledge of wildlife than those who had not previously engaged in such experiences (d=0.46, p=0.02).

Keywords Zoo Education, Program Animals, Guest Interactions, Visitor Behavior, Touch Exhibits

1. Introduction

Patrick, Matthews, & Tunnicliffe (1) note "before conservation can be understood, people need to know basic or fundamental concepts concerning the features that define certain organisms, their behaviors, their habitats, and their interactions with other organisms and the environment." Through this they contend zoos and aquariums must use unique and innovative approaches to connect the average zoo visitor to the animal collection and conservation to increase awareness of global environmental problems. Yet, because of their status in the public eye, zoos are often scrutinized for their use of live animals to reach these goals. Utilization of live animals beyond exhibitory may include use in education programs, shows, demonstrations, as well as for human interaction or touch (2).

It is problematic to estimate an accurate year that the origin of the zoo occurred. However, if a 'zoo' is taken to be defined as: the collecting and displaying of live wild animals, then the earliest forms can be traced back over 4,500 years to historic civilizations such as the ancient Egyptians, Chinese, and Romans (3). The zoo has been an established institution in the community that has evolved over time. The long presence of zoos throughout history is a testament to their popularity in human culture. It is estimated that approximately 175 million individuals visit a zoo or aquarium accredited by the Association of Zoos and Aquariums (AZA) in the United States each year alone.

According to Ogden and Heimlich (4), the modern zoo and aquarium should strive to "further the cause of conservation through systematic education and research." According to the AZA, accredited institutions across the country are dedicated to promoting high standards relating to animal exhibitory and conservation education (5). Modern approaches employed by zoos and aquariums to instill conservation-based thinking and increase scientific literacy struggle to match learning objectives for their visitors with the organization's mission and conservation goals. Knowledge transfer related to learning goals and mission statements becomes even more difficult due to the fact that visitor motivations for visiting a zoo or aquarium are often in direct conflict with the educational mission of many zoological institutions. It has been shown most visitors visit the zoo for recreation rather than to spend the day learning. However, because these crowds are often inclined to be interested in animals and nature, these trips allow for moments for key reinforcement of educational messaging and to strengthen the human-animal bond (6).

Moss and Esson (7) contend zoo visitors are primed with an innate interest in large mammals compared to other taxonomic categories. Because of this, they argue institutions should focus their efforts on increasing visitor interest of the entire animal collection. Recommendations include the

pairing of these less sought after animals with educational talks or unique interpretative methods. For species that are not listed under any endangered statuses and pose no immediate threat to humans, this may include the use of touch as a vehicle to connect humans to animals for education and the advancement of the human-animal bond. In fact, interaction with animals consistently ranks in the top of the best, or highest ranked, experience at a zoo by visitors (8).

The manners in which many facilities choose to achieve conservation education are about as different as the geographical locations in which they are located. Many facilities present exhibits that encourage guest interaction with the animal collection as a vehicle for knowledge transfer and to increase visitor reverence towards wildlife. One of these popular exhibits that can be seen across the country is the touch pool exhibit in which guests can freely interact or touch a variety of marine life, including invertebrates, fish, small sharks, and/or stingrays. It has been argued that these exhibits are entertainment focused with no educational purpose.

This applied research study followed a causal-comparative educational research design described in several reviewed studies. Focus was placed on the evaluation of the practical application of current theories related to educational problems in conservation education related to direct animal contact within zoological facilities. H_0: Zoo visitors do not demonstrate an immediate behavior change in their willingness to protect aquatic wildlife as a result of their interaction in a touch pool style exhibit.

2. Methods

Data was collected at two different zoological facilities. Data collection occurred during regular operating hours over the course of two days at each facility. Both facilities maintained touch pool exhibits similar in design and living animal collection. Animals housed within the exhibits included species commonly found in tide pools of the Pacific Northwest. The touch pool experience was facilitated by a zoo/aquarium volunteer who provided information about the animals and enforced general touching guidelines that were established by each facility.

Participants were asked to complete a survey while waiting in line to interact in the exhibit area. Upon the completion of their visit to the exhibit, participants completed a follow-up survey. Random sampling methods were employed during data collection. Parameters for participation included visitors over the age of 13 currently visiting the zoological facility.

In order to ensure minimal intrusion experienced by the participant, the questionnaire was limited to five questions. No demographic questions were asked as the goal was to analyze overall trends of crowd behavior rather than population specific trends. Limiting factors in the research design stemmed from the complications related to data collection in an active exhibit space. Data collection limitations existed in ensuring completion of the pre- and post-survey.

Measurement instrument was an educational affective survey designed to collect only quantitative data. Answers were a selected response item format; answers were either YES/NO or a Likert scale, with 1 representing the lowest value and 10 representing the highest value. Table 1 provides a detailed overview of survey questions.

Qualitative data sets would have been useful in gathering post-visit information; however, this would have increased participation time and decreased likelihood of visitors willing to participate in the survey.

Table 1. Sample survey questions distributed to study participants

Base Survey Questions (represented by 1-10 scale value)	**Pre-Survey Specific Questions** (represented by YES/NO values)	**Post-Survey Specific Questions** (represented by YES/NO/NOT SURE values)
"…what extent do you feel that aquatic wildlife is globally valuable?"	Have you ever participated in a stingray touch exhibit at any zoo or aquarium?	Did you find this experience to be a positive learning experience?
"…extent of your current knowledge regarding aquatic wildlife?"	Have you ever previously participated in any other animal touch experience at a zoo or aquarium?	In your personal opinion, does this exhibit encourage people to protect wildlife?
"…what extent do you feel it is necessary to protect aquatic wildlife?"		
"…take steps to protect aquatic wildlife and ecosystems?"		

3. Results & Data

Only equal amounts of pre/post surveys were utilized in comparing change in self-reported behavior. Numerical values were averaged and compared collectively. Data analysis was completed combining results from both facilities. Statistical tests demonstrated that data results maintained a normal skew and there were no significant differences in the pre-survey scores between the two different facilities. A total of 133 visitors fully completed both surveys; 62 participants from Aquarium 1 and 71 participants from Aquarium 2.

In the pre-survey, participants were asked to describe previous interactions with zoo/aquarium animals. Sixty-three percent stated they had generally interacted with an animal during a zoo or aquarium visit. Fifty-three percent of guests stated they had previously visited an exhibit in which you could generally feed or touch stingrays.

In the post-survey, participants were asked if they believed that the exhibit facilitation encouraged people to protect aquatic wildlife. Seventy-four percent of participants believed it did, eleven percent did not, and seventeen percent were uncertain.

Comparison of the two facilities illustrates comparable gains in the perceived value of aquatic wildlife and willingness to take action steps to protect wildlife. The self-reported trait regarding the global value of aquatic wildlife increased by 0.25 overall, 0.14 at Aquarium 1, and 0.36 at Aquarium 2. There were differences in the knowledge gained along with the recognized need for protecting aquatic wildlife. Self-reported knowledge in participants from Aquarium 1 increased by 1.28 in contrast to the 0.77 at Aquarium 2; however, the difference is not considered to be significant, $t(62)=-1.558$, $p>0.5$. The recognized need for the protection of aquatic wildlife remained constant overall; however, there was an observed decrease of 0.18 at Aquarium 1 between pre- and post-test and an increase of 0.17 at Aquarium 2. The observed decreased is not considered to be significant, $t\ (62) =.770$, $p>0.5$.

Comparison of pre- and post-test measures revealed that the interaction increased how knowledgeable individuals felt about the aquatic wildlife (Cohen's $d=0.52$, $p<0.001$) and the likelihood that participants felt they would take action to protect aquatic wildlife ($d=0.60$, $p<0.001$). The aquatic interaction, however, had only a small effect on how much participants valued aquatic wildlife ($d=0.20$, NS) and virtually no effect on how strongly participants felt about the importance of protecting aquatic wildlife ($d=0.01$, NS). Please see Figure 1 for a detailed comparison of responses.

Analysis of pre-survey responses was completed by comparing responses based on previous encounters with zoo/aquarium animals. Analysis categories included: 1) guests who interacted with stingrays and had a general encounter with an animal during a previous visit/s to a zoo or aquarium, 2) guests who either interacted with stingrays or an animal generally during a previous visit/s but not both, and 3) those guests who had not interacted with any animal during a previous visit/s to a zoo or aquarium.

Based upon this analysis, it was demonstrated that visitors who engaged in previous experiences at zoo or aquarium with interactive animals indicated higher knowledge of wildlife than those who had not previously engaged in such experiences ($d=0.46$, $p=0.02$). Guests who interacted with stingrays as well as a zoo/aquarium animal on average self-reported higher compared to those guests who interacted with a single animal during a visit and those who have yet to interact with an animal. Please see Figure 2 for a breakdown of participant response values.

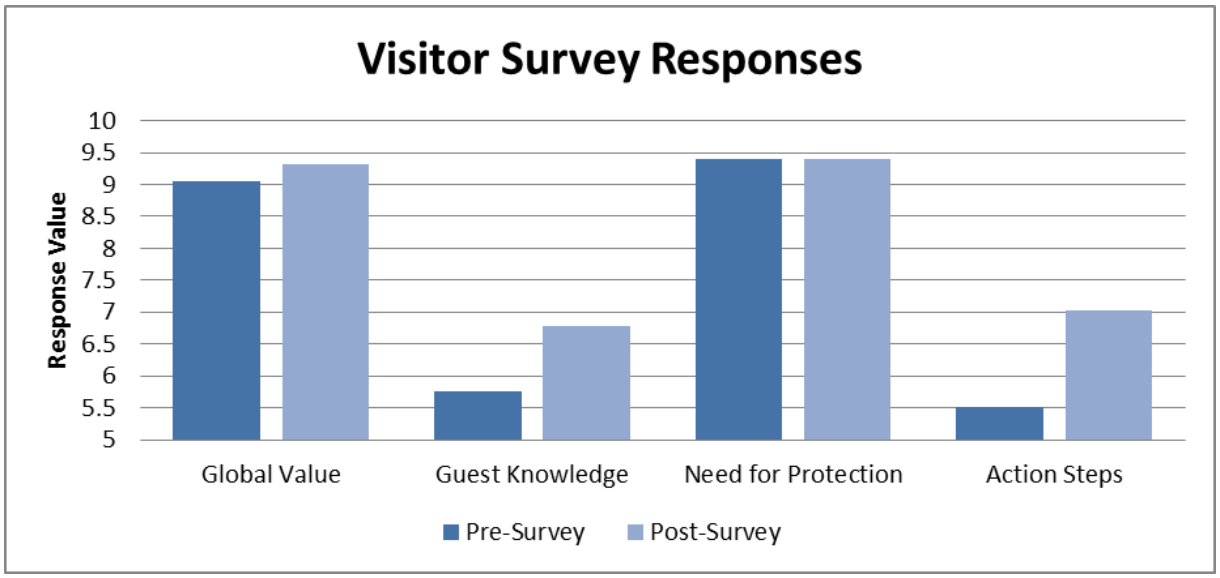

Figure 1. Comparison of pre and post responses

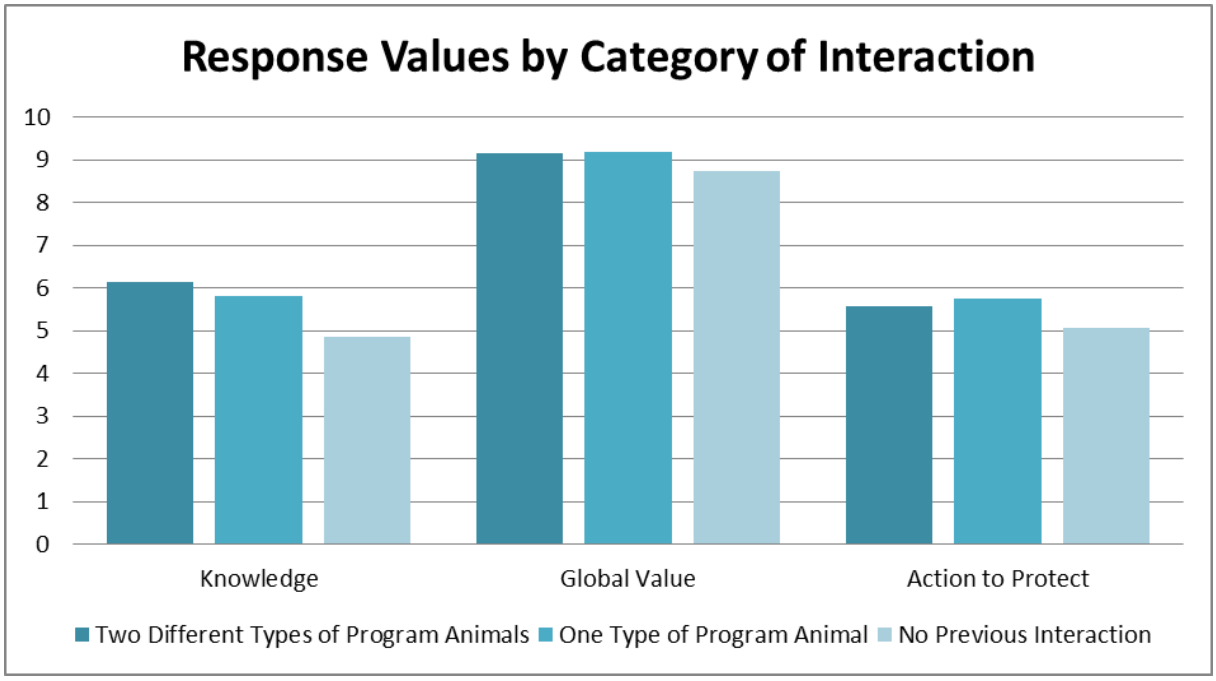

Figure 2. Comparison of category response values based on previous interactions with program animals

4. Conclusions

Largely, statistical data collected at the facilities reflect that the interaction with marine invertebrates in an aquarium facility does instill positive attitudes and knowledge changes in aquarium visitors. According to *Why Zoos Matter*, a study conducted by the Association of Zoos & Aquariums and the Institute for Learning Innovation, it has been demonstrated that a visit to the local zoo or aquarium does not create in an instant change in behavior or attitude towards wildlife. A noticeable change in behavior is a result of the learning that occurred during the visit and the opportunity to synthesize the information learned during the following weeks after the visit (9). This has been echoed in other studies completed on visitor learning and/or behavior change as a result of a visit to the zoo (10).

Povey and Rios (11) conducted a study that asked participants to complete an open-ended survey question. Their study found that visitors watching a presentation utilizing a program animal provided more cognitive responses than those visitors viewing the same animal in an exhibit area. Our findings echoed the findings of Povey and Rios, showing seventy-seven percent of individuals who have generally interacted with an animal during a visit to a zoo or aquarium self-reported values that were consistently higher across all four survey questions. Guests who interacted with both a stingray in a contact exhibit and a zoo/aquarium animal in general reported the highest average values compared to those guests who interacted with an animal during a visit and those who have yet to interact with an animal. Self-reported knowledge about aquatic wildlife illustrated a score difference of 1.29 between guests who have previously interacted with animals to those who have not.

While it can be noted that the interaction with aquatic invertebrates does appear to increase overall appreciation for, and the knowledge of, aquatic animals, it does not appear to immediately instill conservation-based thinking. When asked how likely individuals were to take action steps in their everyday life to protect aquatic wildlife, there was no overall change in behavior. The true change in behavior appears to be synthesized after the visit. This is demonstrated by the greater than 0.50 increase in self-reported action steps to protect aquatic wildlife between guests who have previously interacted with animals to those who have not. Based on the findings of Clayton, Fraser, & Saunders (6), it is estimated that the differences are not more dramatic because the participants already have a positive bias towards animals and conservation.

Differences between the self-reported values of the visitors from the different facilities highlight areas of concern for zoological managers and interpretative planners. Messaging delivered by volunteers is the primary media for the delivery of educational messaging. In order to ensure the greatest gains in knowledge, individuals stationed at interactive exhibits must place a focus on teaching guests about the animals in addition to rule enforcement. It is hypothesized the quality, tone, and frequency of message delivery had the greatest impact on the visitors.

Carr and Cohen (3) assessed the picture modern zoos paint for their visitors in order to create a positive public perception. Their findings demonstrated that nearly fifty percent of facilities studied allowed for general interaction with animals, which they designated as an entertainment focused activity rather than an educational activity. They argue these types of interactions can in fact hinder the public perception of the facility rather than enhance the perception.

In a study focusing on public perception, Reade & Waran (12) demonstrated community members who do not often visit the zoo demonstrate a negative perception of zoos and aquariums. Zoo visitors often list management concerns of the animals as one of the worst experiences (8). In order to foster the highest educational gains, it is important for institutions to design facilities and messaging that combat these negative public perceptions while enhancing the overall welfare of the animals.

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