

**Family Engagement in Live Animal Touch-Tanks and Natural Tidepools:  
Links to Learning and Conservation Dialogue**

Susan O'Brien

Oregon State University

[obriensu@onid.oregonstate.edu](mailto:obriensu@onid.oregonstate.edu)

Shawn Rowe

Oregon State University

[shawn.rowe@oregonstate.edu](mailto:shawn.rowe@oregonstate.edu)

Mark Farley

Oregon State University

[farleyma@onid.oregonstate.edu](mailto:farleyma@onid.oregonstate.edu)

**Abstract**

A large number of museum visitor studies have focused on interactive science exhibits as rich places for learning. Some have demonstrated the overall value of live animal encounters and animal touch experiences. Although few studies have examined visitor engagement in such live animal exhibits, the same are thought to promote public conservation awareness. This paper reports preliminary findings from a larger research project comparing families' engagement in activities at a live animal touch-tank and at nearby natural tidepools. The larger study makes inferences about learning affordances provided by the features of each settings and family group social interaction, and it investigates possible links to conservation values. Mixed methods include in-person and video observations, on-site surveys, semi-structured interviews, focus groups and a quasi-experimental component. The entire research process is driven by experiences co-

constructed with participating families, taking a true reflective approach to design and implementation of methods as well as the interpretation of results. Preliminary results from observation and interviews demonstrate good evidence for the larger study of indicators of group dynamics, potential indicators of learning affordances, and potential indicators of values affordances.

## **Introduction**

Research on learning in informal learning environments is a growing field in the US, offering valuable insights into science education and communication. Such research contributes to a developing understanding of how “learning” takes place in museums and similar settings. There is a large body of research that focuses on museum interactive science exhibits as rich places for learning (e.g. Gutwill and Allen, 2010). Some studies also demonstrate the overall value of visitor experiences within U.S. Zoos and Aquariums (e.g. Falk et al. 2007; Fraser & Sickler 2009). Although there is limited research on the impact of live animal encounters, the few studies point out that such exhibits can be rich settings for learning science. Furthermore, there is a general belief that touching and/or interacting with live animals facilitate affective reactions of care, therefore helping create conservation awareness.

Research on cognitive and affective aspects of visitors’ experience in live animal encounters is a prime component of determining public perceptions on conservation. Research shows that AZA (Association of Zoos and Aquariums) accredited venues in North America measurably impact conservation attitudes and understanding of adult visitors. The impact of live animal interactions on visitors’ conservation attitudes and/or behavior has been investigated in many studies, most pointing to positive correlations, at least to some degree (e.g. Ballantyne et al., 2007; Falk et al., 2007; Hughes, 2011; Kisiel et al., 2012).

In face of the recent NOAA efforts towards increasing ocean literacy, aquariums and marine science centers play a pivotal role in education efforts, by offering the public the opportunity to engage in marine science learning and fostering visitor-animal interactions that can promote conservation attitudes. In order to attend to this need, we have begun a large scale study employing multimodal analysis of families’ discourse and

action while interacting and engaging in activities at a touch tank at a US west coast aquarium and at nearby natural tidepools, in order to look at scientific learning affordances and links to visitor's conservation values. That project includes as an important component participants as co-researchers helping develop research questions, indicators of learning, and even the research design. In this paper, we report on findings from preliminary research designed to identify potential affordances of the two sites for supporting conservation dialogues and learning from the perspectives of visitors to the touch tank site.

### **The Research Site**

The tidepool touch-tank exhibit is situated in an interactive ocean science museum and aquarium on the US west coast in Oregon. The touch-tank contains a variety of eastern Pacific invertebrates and vertebrates such as sea anemones, sea stars, abalones, fishes, and sea urchins and has a naturalistic design to resemble natural tidepools. It is divided into four sections with different heights allowing access by a diverse audience. The touch tanks are a very popular exhibit, especially among children, and families spend an average of about 20 minutes engaging with them.

The larger study also involves working with visitors to a natural tidepool setting located several miles from the touch tank site and within a federally controlled marine Outstanding Natural Area extending out from the Oregon Coast one mile into the Pacific Ocean. It is now a day-use area and visitors have to chance to observe intertidal life during low tides, largely during spring and summer seasons. It is one of the most visited spots on the Oregon Coast and many visitors who visit the tidepools here also attend the museum holding the touch tanks.

### **Methods**

As an initial pilot, three families were interviewed after their visit to the touch-tank exhibit. The sample was a convenience sample and families were approached when leaving the exhibit and were interviewed as a group. Semi-structured interviews lasted from 15 to 20 min and were audio recorded for later reference. Interview items included demographic items, items to gather families' perceptions, meaning making, and values

associated with their activity at the touch-tank. Adults and children were encouraged to engage in collectively answering the questions. Interviews were then transcribed using Transana Software and coded to identify patterns and common themes supporting the creation of categories to inform theoretical constructs. Thematic analysis was conducted and compared with initial data from unobtrusive observation of groups.

All three families were local families with multiple generations represented. All had young children at pre-school age and all reported to frequently visit informal educational settings such as zoos, aquariums, museums, parks, etc. The overall reason given for visiting the touch-tank for all families was to bring the children to a fun, hands-on and inexpensive activity.

### **Preliminary Findings: Interview Data**

Highlights from the preliminary findings fall into three main categories: Group dynamics, potential indicators of learning affordances, and potential indicators of values affordances.

**Dynamics of the group:** the repeating themes and codes point to three main categories accounting for family group interaction and dynamics: interactions inside and outside the group, role playing, and negotiation of non-engagement.

Interaction inside and outside the group: Group members not only interact among themselves, but they also break into dyads, triads, loners, etc., in order to engage with others outside the group such as the volunteer interpreters or members of other family groups visiting the touch-tank at the same time. In the example below Martha, a grandmother in one of the groups, explained how her granddaughter left the group ensemble to talk to members of a different group:

*“Well... she (granddaughter) interacted with two other little girls in the other side and they were all putting their hands in there and she enjoyed that. There wasn't really anybody (visitor) over there about the same time as we were but there were two little girls she interacted with.”*

Role Playing: Different family members take on different roles during interaction, such as chaperoning, facilitating exploration for other members of the group, and hooking other members into paying attention or engaging in some interaction. Such roles seem to be exchangeable as the activity progresses, and family members can play multiple roles. Martha talks about her granddaughter hooking grandpa into looking at something at the touch-tank:

*“Martha: my granddaughter really enjoyed that, I mean ... she brought my husband... "look grandpa"...you know yeah, so it was pretty cool anyhow.”*

Non-engagement in activity: Some family members do not engage in certain interactions such as touching an animal, largely because of fear or, in the case of kids, because they get distracted by other exhibits:

*“Interviewer: (still talking to girl 1) you didn't touch any animals?”*

*“Mother: I was encouraging her but she is not ready yet... (unintelligible)... I think she was a little bit scared.”*

*“Martha: my grandson was like all over the place though. He did a little bit but then he is off and running. He is more interested in levers than in starfish (laughs).”*

**Indicators of learning affordances**: the repeating themes and codes point to four main categories accounting for family learning affordances: reference to prior knowledge and experiences, reflective statements, and scientific talk:

Previous Knowledge and Experience: group members use analogies, comparisons and tell histories involving previous experiences in order to relate to the present touch-tank activity. See the example below where one family member recalls his earlier visit when he was a child:

*“Grandpa: I can remember when I was a kid coming here, I liked to touch the octopus. But that has been many many many years ago (laughs).”*

*“Interviewer: Why do you think you can still remember that experience?”*

*“ Grandpa: It was a middle school field trip. We actually came over here, we didn't have the Oregon Coast Aquarium, but we did have this thing. It was part of the field trip we got to go on over here. Then we went to the light house. So, you kinda tend to remember those things from childhood.”*

Reflective Statements: group members use larger reflective statements on aesthetic aspects of ocean life, on human relations to the ocean and on oceans vs. land.

*“Mother: you know, we look at the slight blue color and we enjoy the beach, the waves coming up, but the kids don't really put that with life as such, so it is good to make that connection between the ocean is full of life, land is full of life, that sort of stuff.”*

Scientific Talk: group members use language that expresses some sort of scientific talk, in this case either biological, ecological or conservation talk as in the example below:

*“Martha: we were talking about the fishing line on the birds because quite honestly some of them only have one leg and that is why. Because they get something caught on it like the things with the plastic rings on the soda can or the fishing line that someone just threw out after they were done, you know, fishing, they didn't take and put it in the garbage, they just threw it out and the birds get tangled in them and, you know that sort of stuff yeah.”*

**Indicators of activity value:** Families assigned value to many activity components and aspects. They report valuing the opportunity to explore, get close to animals, using their senses and touching, and exposing their kids to do the same. They also value being able to ask questions and receive help from volunteers. Moreover they report valuing the hands-on experience and the opportunity to learn, as shown in the quote below:

*“Mother: The thing that is really neat about a touch tank is that instead of just looking at it, you got to experience it with more of your senses, and most of the time with things like in aquarium, unless you are in a scuba outfit or something, there is really no direct way to directly experience that physically. With the touch tank, you just “Oh...I had no idea would feel like that or respond to me that way.”*

Another important aspect that emerged, especially if this data is to be compared to data from families visiting the natural tidepools, is the fact that all families brought out the value of the touch-tank being an indoor setting, with a certain level of comfort and safety when compared to the natural tidepools at the Oregon coast. Families with younger kids especially seemed to think it is easier for them to use the touch-tank than to use the natural tidepool, as they don't like to get cold, or don't want to be worried about the kids falling in slippery rocks, getting wet, etc.

*“Mother: Sometimes, here in Oregon because of all the rocks and everything you just can't let the kids run around and actually touch things, it is slippery, it is all that other stuff and so this is safe environment to actually get to see stuff.”*

A further definite pattern observed at some point during the activity is that family members used words such as amazement, wonder, awe, excitement and thrilling in reference to the live animal touch experience. These words perhaps are emotional indicators, which play a role in their cognitive development and may be related to conservation talk as suggested by the literature. The participating families did demonstrate levels of conservation talk as in the example below:

*“Martha: well I think because we are all stewards of the, our environment, you know, if we ignore that and it gives us this feeling that we are superior or that, you know, that whatever we do is ok and it isn't, it isn't ok, so it is kinda you know, that kinda thing about taking the extra step to make sure you don't leave*

*anything on the beach, that you have picked up after yourself and all these other things. That we are protecting other species.”*

## **Conclusions**

In sum, though the sample size in this exercise is very small for justifying bigger claims, the data are rich enough for the reflective start of some theoretical ideas and shaping the overall study. Overall, when asked about why they decided to visit the touch-tank, family members said they wanted to bring kids to a fun hands-on experience, which may indicate they see these kinds of activities as leisure activities, being hands-on a criteria for choosing such places. Nevertheless, they reported value in the opportunity to learn when asked about reasons why they think such experiences are important, which may indicate that perhaps, even though their motivation to visit in the first place was not directly learning, they do see such settings as places for learning. They also make direct connections between the touch tank experience and conservation ideas and values as well as their personal knowledge and previous experience. Moreover, the nature of the touch tanks supports multiple types of interaction and roles for all family members, potentially leading to multiple kinds of learning outcomes.

## **Significance of Results of larger study**

It is anticipated that patterns of family behavior and emerging themes will be observed during data collection. These patterns and themes may emphasize areas of strengths and weakness in how families engage in touch-tank and natural tidepool activities and how it may impact their cognitive and affective development vis-à-vis conservation ideas and values. Such outcomes can provide important insights into how families arrive to meaningful events that afford learning to occur, including influential aspects of their own personal and socio-cultural upbringing, as well as aspects of the physical environment that they are experiencing, in this case both the touch-tank exhibit and the natural tidepool. What are the features and attributes of the touch-tank and natural tidepool that affords people to engage in meaningful events with potential to generate cognitive, affective and social development? This can have large implications not only to the validation of methods and tools for mixed-methods research in informal learning



settings, but also to inform better educative practices and design of effective exhibits and experiences that meaningfully engage visitors.

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