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This chapter explores visitors' environmental learning in zoos and aquariums, inclusive of narrative accounts that demonstrate the impact of such experiences in the lives of visitors regarding the process and outcomes.

The Role of Zoos and Aquariums in Education for a Sustainable Future

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Throughout history, zoos and aquariums have fulfilled a number of different roles, including the collection and display of exotic animals; scientific research; the provision of entertainment, recreation, and leisure; zoological education; animal welfare advocacy; conservation fundraising; in situ and ex situ conservation programs; and conservation education. More than 600 million people—approximately 10 percent of the world's population—visit over 1300 zoos and aquariums throughout the world each year (<http://www.waza.org/en/site/zoos-aquariums>). For many urban residents, a visit to a zoo or aquarium provides a rare opportunity to connect with nature.

Zoos and aquariums today consider education to be a central role. The vision of the World Association of Zoos and Aquariums (2005, p. 35) is that “Zoos and aquariums with their unique resource of live animals, their expertise, and their links to field conservation will be recognized as leaders and mentors in formal and informal education for conservation.” Most zoos and aquariums have education staff and trained volunteers who provide education programs for school groups and general visitors; animal demonstrations routinely convey education or conservation messages; and interpretation and education are an integral part of zoo and aquarium exhibits.

Although conservation education is an accepted part of the mission of modern zoos and aquariums, it is not usually at the top of most visitors' “to do” list for their day at the zoo. The remainder of this chapter thus considers environmental learning (changes in cognition, affect, attitudes, and behavior in relation to both the conservation of species and protection of the environment) in zoos and aquariums from the *visitors'* perspective. What are *they* looking for from their visit and how compatible is this with

the zoo's mission? What evidence is there that learning is taking place, and what impact does this have on environmental behaviors? How can zoos and aquariums support and encourage environmental learning and the adoption of environmentally sustainable behaviors?

Motivations for Learning at Zoos and Aquariums

When it comes to visitor learning, zoos and aquariums have much in common with other informal education institutions such as museums. These sites provide direct experience with real objects, people, places, or animals; learning is voluntary and is stimulated by the needs and interests of the learner; and they potentially provide a very learner-centered experience, which involves exploring and examining, making choices, making personal connections, developing one's own way of understanding, and controlling one's own learning environment (Anderson 1995; Falk, Dierking, and Holland, 1995; Hooper-Greenhill, 1995; Paris, 1997). Because learners have so much choice regarding what, where, when, how, and with whom they learn, such experiences are often referred to as "free-choice learning" (Falk and Dierking, 1998).

If participation in learning is a matter of free choice, then visitors' motivations become extremely important. According to Falk (2009), people in the affluent West in particular are increasingly using their leisure experiences to find personal fulfillment and satisfaction, and to build their personal and group identities. He argues that free-choice learning is different from the "compulsory" learning that takes place in schools or workplaces because it is based not on performance but identity building and is driven by identity-related goals. Falk (2009) documents five such roles: explorer, facilitator, experience seeker, professional/hobbyist, and recharger. Testing his model in a number of U.S. zoos and aquariums, Falk and Storksdieck (2010) found evidence that visitors' entering identity-related motivations influenced both the way they went about their visit and the meaning they made of their visit.

Our own research has reinforced the important role of visitors' motivations in free-choice learning contexts and demonstrated that visitors' motivations vary at least to some extent as a function of the particular site they are visiting (Packer and Ballantyne, 2002). We found that visitors to an aquarium were less interested in the learning-related aspects of their visit than visitors to a museum or an art gallery. Visitors to the aquarium were more interested in the social and restorative aspects of their visit. We also found significant differences in visitors' perceptions of the sites themselves, with the museum being seen as predominantly educational, the aquarium predominantly entertaining, and the art gallery an equal combination of both. However, visitors to the aquarium were more likely than visitors to other sites to agree that "There are lots of opportunities to learn here" and

“Learning here is a fun thing to do.” We concluded that visitors to the aquarium in particular were interested in an experience where learning is fun. (The visitors who participated in this study were independent adult visitors and included local residents and interstate and international tourists.)

In further exploring the compatibility of education and entertainment in visitor experiences (Packer and Ballantyne, 2004), we found that for visitors, these constructs are not mutually exclusive but complementary. Evidence from a range of measures supported the conclusion that, at sites such as zoos and aquariums, the educational and entertainment aspects of the visit are not only compatible, but synergistic. What people appear to be seeking is “an experience in which education is entertainment, discovery is exciting, and learning is an adventure” (p. 68). Like children’s play experiences, adults’ leisure experiences can provide opportunities to gain an understanding of themselves and the world (Mitchell, 1998). Indeed, tourism and leisure experiences are often motivated by a need for novelty or change, for new sources of stimulation and adventure, or to explore and understand the unknown (Lee and Crompton, 1992; Snepenger, 1987). Zoos and aquariums are well suited to such a playful approach to adult education.

The term “learning for fun” (Packer, 2006) refers to learning as an experience that is enjoyed and valued for its own sake, regardless of the presence or absence of learning outcomes. More than just affirming that learning *is* fun, learning *for* fun emphasizes the motivational value of the process rather than the outcome of learning. Its importance lies in the observation that visitors who have no particular learning agenda can be drawn into a learning experience that is both enjoyable and productive.

The Impact of Wildlife Encounters on Visitors’ Environmental Learning

If, as discussed above, visitors to zoos and aquariums are open to, or even expect, an experience that includes learning, and if zoos and aquariums consider conservation education to be a part of their mission, or even their *raison d’être*, it is important to consider the role that zoos and aquariums can play in adult environmental learning. It has to be acknowledged that there are certain limitations to that role. Visitors may only be on-site for a couple of hours; there is rarely any formal structure or sequence to the experience that builds on prior knowledge or reinforces visitors’ learning in any systematic way; the educational offerings have to appeal to visitors from a wide range of ages and backgrounds; and visitors may choose to disengage or be distracted from the learning experience at any point.

According to the World Association of Zoos and Aquariums (2005), “the aim of conservation education is to interpret living collections to attract, inspire and enable people to act positively for conservation” (p. 40).

We have recently completed a major study, collecting data from over 1000 visitors to four different wildlife tourism attractions, to investigate the extent to which zoos, aquariums, and wildlife-based tourism can and do actually achieve this aim (Ballantyne, Packer, and Falk, in review; Ballantyne, Packer, and Sutherland, in press). We found that four months after their visit, 39 percent of respondents were able to state some new knowledge or understanding they had gained, and still retained, as a result of the experience; 5 percent reported having questioned their values or changed their personal attitudes; and 7 percent were able to report some new actions they had taken in support of the environment, as a result of the wildlife tourism experience. These actions included:

- Changing household practices (such as not using as many plastic bags and being very careful about what goes down the drain)
- Changing purchasing practices (such as avoiding products that would contribute to harming dolphins or whales)
- Taking responsibility for the environment beyond the home (picking up rubbish on the street, for example)
- Seeking further information (on the Internet and TV)
- Discussing environmental issues (with friends, family, and others)
- Volunteering for environmental causes (such as neighborhood clean-ups)

Analysis of visitors' memories of their visit after four months had passed provided further evidence of the ability of wildlife encounters to attract, inspire, and challenge visitors. Visitors reported quite vivid memories—they remembered sights, sounds, and smells; they remembered what it was like to be physically close to the animals and see them from a new or different perspective. Some visitors reported an emotional affinity or connection with the animals they saw; they reported trying to understand what the animals were feeling, or felt they had interacted or communicated with the animals. Information visitors were given about the dangers faced by the animals, particularly the threats posed by human actions, seemed to stay in their memories longer than factual information about the animals and aroused feelings of protectiveness and concern. This in turn led people to reflect on their own role in relation to the environment and to take more personal responsibility than they had previously accepted, in some cases resulting in direct action.

Visitors' Accounts of the Impact of Aquarium and Marine Park Experiences

The following brief extracts use visitors' own words to describe their aquarium or marine park experience and its impact on their subsequent understanding,

attitudes, and behaviors in relation to the environment. Often it was something about the experience itself—something that visitors saw or heard—that prompted them to reflect on their relationship with the environment. For example, an aquarium visitor was drawn in by the opportunity to see familiar creatures from a new perspective: “What we most enjoyed about the visit was being able to see the creatures in their natural habitat. Being a fisherman you only ever see fish out of water, when you catch them on a line.”

This experience can highlight for the visitor the need and desire to know more about the environment: “I think you take a lot of things for granted, and as a person growing up by the sea I probably don’t know enough about what’s underneath it.” It can engender new understandings and a new appreciation for the environment: “My children are now more aware of marine life being more than just something to look at, i.e., that they are living creatures and should be respected.”

Visitors often responded emotionally to the experience, felt an emotional connection to the animals, or identified with the animals in some way: “My strongest feelings were when I saw the dolphins and what smart amazing animals they are. Also the bears as to what their thought patterns are about people looking at them.”

For some visitors, their new understanding led to further reflection about global environmental issues, and their own response to these: “I never used to think about the effects that climate change or global warming would have on marine life. Why would I? I never have had much interaction with it! But now I understand a little more and find myself wondering what little things I can do to help, small though they may be.” “We don’t look after what we have and the realization that it is not going to be there forever and our children will miss out on what we have if we don’t take care of it.”

Information about human impacts on the animals being observed, and specific practical things that they could do to redress these, seemed to be particularly powerful, as expressed by this marine park visitor: “I remember learning about the plastic rubbish that strangles birds . . . I have become more aware of the runoff going down stormwater drains and the potential danger of rubbish, particularly plastic bags, in runoff water. If I see these lying around I pick them up and encourage others to do same.”

In some cases, environmental learning continued beyond the visit itself, as visitors’ new awareness made them more open to receiving conservation messages from other sources: “Afterwards we went to see *Happy Feet* at the movies—I believe I heard and saw more of the pollution and conservation messages as a result of my visit.”

Some people reported having made changes to their behavior as a direct result of their aquarium or marine park experience: “It has made me more aware of what other people are doing and I often pick up after them.” “Although I don’t have a boat I remind friends that do to check that the paint that they are using on the keels is environmentally friendly.”

These examples may represent only small shifts in the context of education for a sustainable future, but such experiences are cumulative and build the learner's capacity for future action or further learning (Rounds, 2004).

Factors That Facilitate Visitors' Environmental Learning in Zoos and Aquariums

Our research has tried to identify some of the features of zoo, aquarium, and other wildlife tourism experiences that facilitate visitors' environmental learning, and in particular, increase the likelihood that visitors will take action as a result of their visit. Visitors' learning is often greatly influenced by the environmental orientations and visit motivations that they bring with them to their visit (Ballantyne, Packer, and Falk, in review). Thus, people who are already interested in environmental issues and who are motivated to learn are more likely to learn from the experience. On the surface, this appears disappointing. However, two things need to be said. One is that "No experience lives and dies to itself" (Dewey, 1963, p. 35). Each experience changes the visitor in some way so that it is a slightly different person who then enters the next experience. From a constructivist perspective, new learning builds on and revises prior experience. Thus any small increase in environmental awareness gained through one visit will contribute to new learning in the next visit. Zoos and aquariums can be viewed as part of a large network of educators, with a shared long-term vision regarding their influence on visitors' environmental learning. The second is that "Entering motivations can be influenced by how a site is marketed" (Ballantyne, Packer, and Falk, in review, p. 13). As zoos and aquariums increasingly promote themselves as institutions for conservation education, visitors' expectations and visit agendas will follow suit, with a concomitant effect on environmental learning and behavior change.

According to our research findings, the aspect of the visit itself that had greatest impact on visitors' environmental learning was the extent to which they were engaged *reflectively* during their visit. Reflective engagement involved both cognitive and affective processing of the experience and focussed on what visitors felt and thought, for example, feeling an emotional connection with the animals, reflecting on new ideas about animals and their environments, discussing new information with companions, feeling sad or angry about environmental problems. These responses were more strongly associated with learning outcomes than the immediate but fleeting excitement of seeing the animals.

Kolb's (1984) experiential learning cycle sheds further light on this finding. The free-choice learning that takes place in zoos and aquariums is perhaps best understood as experiential learning, or making meaning from direct experience. Kolb's theory suggests that there are four stages in the

experiential learning cycle: *Concrete experience* provides a basis for *reflective observation*, which elicits the personal meaning of the experience. This may then be followed by *abstract conceptualization*, where new concepts are formed. These are developed into implications for action, through which a change is made in a process of *active experimentation*, and this in turn leads to the next concrete experience. In simpler terms, this is a cycle of experiencing, reflecting, thinking, and acting. In the zoo context, a visitor observes, attends to, engages, or interacts with the animals in some way. This arouses an emotional and/or cognitive response within the visitor. They may identify with the animal's struggles, feel some kind of connection with the animal, and develop an appreciation for the uniqueness of each animal or the ways different parts of an ecosystem are linked together. They come to realize that their own actions have an impact on the environment that they share with these animals and accept a new or increased responsibility to care for it. With a new identity as "someone who cares," they seek out small and achievable actions they can take and move a step closer to more sustainable living. The narrative accounts in the previous section demonstrate this process in the lives of real visitors.

Practical Suggestions for Enhancing the Role of Zoos and Aquariums in Education for a Sustainable Future

In the light of these findings, there are a number of things that zoo and aquarium educators can do to optimize the long-term impact of the visitor experience (Ballantyne, Packer, and Sutherland, in review). Animal exhibits can be designed to incorporate multiple senses, provide opportunities for visitors to get as close as possible to the animals, or see the animals from a new and different perspective. Interpretive commentaries and signage can be designed to reinforce visitors' sense of wonder, awe, excitement, and privilege, and encourage visitors to use their imaginations to enter into the animals' world, identify with individual animals, and experience empathy. Interpretive signage, educational programs, or keeper talks should also focus on the dangers faced by the animals, especially dangers due to human actions; the ways in which people's everyday behaviors impact both positively and negatively on the animals; and the practical things individuals can do to contribute to the welfare of the specific animals they have observed, wildlife in general, and their own local environment.

As visitors come with a wide range of prior experiences, including variation in the number of times they have already visited the specific site, interpretation and education needs to be offered at many levels. In particular, the needs of those who are already environmentally conscious should be addressed with the aim of moving them another small step forward.

Visitors should be encouraged to reflect on the meaning of their experience and to discuss it with companions or family members, both as part

of the visit itself and when they have returned home. The use of poetry at the Central Park Zoo in New York is one example of how zoos and aquariums can encourage such reflection (Institute of Museums and Library Services, 2006).

It needs to be recognized, however, that the whole experiential learning cycle cannot realistically be completed during the visit itself. It takes time for visitors to process their experience both cognitively and affectively; to develop new concepts, ideas, and identities; and to actively experiment with these in their everyday lives. Ideally, visitors need to be supported and encouraged to engage in this process and to translate their good intentions into real actions. In this regard, our current research is exploring the role that zoos and aquariums can play *after the visit*, through the provision of post-visit “action resources” (Ballantyne and Packer, in press). Such materials would build on and extend on-site environmental learning and provide examples of a range of actions that visitors might take in response to their on-site experience.

Although research from formal education contexts demonstrates the importance of the reinforcement and consolidation of learning, such post-visit reinforcement of learning is rarely provided in the context of free-choice environmental learning experiences. Without such support, research suggests that visitors’ immediate post-visit enthusiasm to engage in more environmentally responsible behaviors can be relatively short lived (Adelman, Falk, and James, 2000; Ballantyne and Packer, in press; Rickinson, 2001).

Conclusion

Zoos and aquariums have the potential to reach large numbers of the general public with a powerful message regarding the plight of our planet and the need for individual and community action. Their potential lies in the power of animal encounters to engage, connect, provoke, and challenge visitors to action—but this power needs to be carefully harnessed and strategically directed. Our research has revealed important features of the zoo and aquarium experience that are most effective in encouraging visitors to adopt more environmentally sustainable practices in their everyday lives. Further research in this area needs to explore the influence of both prior and post-visit experiences and identify effective strategies to increase the percentage of visitors who make actual changes to their environmental behavior as a result of a zoo or aquarium visit. In this way, zoos and aquariums can ensure that they will play a vital role in educating their communities for a sustainable future.

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