UNIVERSITY OF CALIFORNIA, SAN DIEGO

Learning in Human-Dolphin Interactions at Zoological Facilities

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Education

in

Teaching and Learning

by

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2009

The dissertation of Diane L. Sweeney is approved, and it is acceptable in

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<div align="right">Chair</div>

University of California, San Diego

2009

DEDICATIONS

During the course of my doctoral studies, a demanding and intense journey that I liken to Class V whitewater rafting, my small immediate family weathered several extraordinary experiences: a birth and a death; a marriage and a divorce; three acute hospitalizations; the death of a beloved pet; and the economically challenging business climate of 2009.

Because of their unwavering support and love during the Ed. D. process, this dissertation is dedicated to: my husband, Jay; my daughter, Shannon; my son, Jason, and his wife, Amanda; my sister, Patsy, my late mother, Natalie, and my two-year old granddaughter, Victoria, whose enthusiasm and joy in learning delight and inspire me every day.

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VITA

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ABSTRACT OF THE DISSERTATION

Learning in Human-Dolphin Interactions at Zoological Facilities

by

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Doctor of Education in Teaching and Learning

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Paula Levin, Chair

This research aimed to better understand learning in zoological settings, particularly learning about marine mammals, by investigating the research question, *what do people learn through interacting with dolphins in zoological facilities*? Sociocultural situated learning theory, specifically a Community of Practice (CoP) model of learning (Lave & Wenger, 1991), was the theoretical framework. The CoP

model allowed for diversity of knowledge, interest, motivations, and goals that existed among the community of *animal enthusiasts* at three commercial zoological facilities, and also for peripheral to more central types of participation.

I collected data through interviews of spectators, visitors, and trainers (n=51), observations (n=16), and an online questionnaire of past-visitors (n=933). Data were coded, categorized, and analyzed based on the National Science Foundation's (Friedman, 2008) and the National Research Council's (2009) frameworks for informal science education.

Five principal findings answered the research question. First, all participants gained new knowledge within three broad categories: (a) dolphin physiology and natural history, (b) care and training of dolphins, and (c) conservation. Second, all participants constructed personal meanings by connecting the activity to experiences, beliefs, and practices outside the interaction context. Almost all participants made associations with conservation. Third, most participants shifted their attitudes and gained a sense of personal agency about beginning or increasing stewardship actions. Fourth, visitors learned interspecies etiquette skills; trainers learned skills in dolphin training and management, people management, and teaching. Fifth, visitors had long-lasting memories of the experience that occurred eight months to 18 years in the past.

Popular cultural ideas about dolphins and the ways the dolphins were represented influenced visitors' expectations and the types of learning. Potential physical mediators of learning were close proximity to living dolphins and eye-to-eye immersion. Potential social mediators were membership in the CoP, and interacting

with experts and co-participants. In the personal realm, potential mediators were the participants' strong affective responses to the experience, including interest, engagement, positive emotions, and feelings of affinity to the dolphins. The collective influences appeared to move participants towards stronger identities as environmentally-caring and responsible individuals who take stewardship action.

I. LEARNING IN INFORMAL SETTINGS:

RATIONALE AND RESEARCH APPROACH

Introduction

Meeting a large animal face-to-face can evoke curiosity, delight, and even terror in some circumstances. In the protected and relaxed environs of aquariums, zoos, and marine parks, human visitors can spend unhurried time watching and learning about animals with which they would not normally have such close contact. These experiences can broaden one's views of the natural world, stimulate questions, and bring alive the science content related to animals, habitats, and natural systems about which a person may have read, watched in the media, or glimpsed in the wild.

Zoological institutions have the potential to be dynamic resources for science learning at a variety of levels, for all ages, and throughout one's lifetime (Banks, Au, Ball, Bell, Gordon, Gutiérrez, Heath, Lee, Lee, Mahiri, Nasir, Valdés, & Zhou, 2007).

However, there are many challenges in determining what and how people learn in these settings not only because of the diversity of the people (e.g. differences in interests, knowledge, and motivations), the voluntary and recreational nature of the experiences, and the brevity of a single visit, but also because attempts to apply notions of learning from school settings have inadequately represented the breadth and intricacies of experiences in aquariums and zoos.

The purpose of this research was to contribute to better understanding of what

and how humans learn in zoological facilities by examining one specific activity, the human-dolphin interactions, also known as dolphin encounters. This chapter introduces key aspects of the investigation, including the rationale for its focus, my positionality, the research question, the operational definition of learning, the theoretical constructs, and descriptions of what constitutes evidence of learning in this study, and the frameworks that helped to organize the data analysis. It begins by establishing zoological facilities as places for learning.

The Role of Aquariums and Zoos in Science Education

Education is at the core of the mission of most zoos and aquariums (Alliance of Marine Mammal Parks and Aquariums [AMMPA], 2009; Association of Zoos and Aquariums [AZA], 2009a; Patrick, 2007). These institutions typically offer an array of opportunities to learn scientific information, practice different levels of science inquiry skills, investigate scientific research questions, and learn about the social and political issues that have led to concerns about the viability of some animal species and their natural habitats worldwide.

Casual visitors can learn through observing animals, reading informational signs, publications, and zoo Web sites, watching shows and demonstrations, talking to zoo personnel, and participating in various aquarium and zoo-sponsored thematic educational activities[1]. Visitors with particular interests and more time can attend

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[1] Many aquariums and zoos partner with other organizations to develop educational materials and events to promote awareness about specific animal-related issues, such as International Migratory

tours, lectures, and classes. Some aquariums and zoos offer opportunities for close-contact with a few animals and some of the larger institutions sponsor wildlife-viewing trips to exotic locales.

For school children and teachers, many aquariums and zoos provide specialized classes and materials that align with state and/or the National Science Education Standards (Yager & Falk, 2008). The National Science Education Standards (NSES) System Standards (National Research Council [NRC], 1996) recognize the role of zoological institutions as an integrated component in a comprehensive nationwide science education plan that includes the government, national organizations and societies, and the private sector. Most aquariums and zoos provide on-site education programs for schools, and some also offer outreach programs that take instructors, biological specimens, audio-visual materials, and sometimes even live animals to the schools.

Aquariums and zoos are science institutions. They are engaged in science activities, employ scientists, collaborate with other scientific institutions, and regularly publish peer-reviewed scientific papers about research related to the animals in their collections and to species and habitats in the wild (e. g., Dolphin Quest, 2009; Hubbs-SeaWorld Research Institute, 2009; New England Aquarium, 2009; Wildlife Conservation Society, 2009). Aquariums and zoos are science and education resources in their communities and most Americans trust them as reliable sources of accurate

Bird Day (the second Saturday in May each year), International Year of the Reef 2008, and The International Polar Year (2007-2008).

information about animals and animal-related issues (Alliance of Marine Mammal Parks and Aquariums [AMMPA], 2005; The Ocean Project, 2009).

People are motivated to visit aquariums and zoos for a variety of reasons, such as to spend recreational time with family members, to facilitate a child's learning, and to have a restorative experience (Falk, 2009; Falk, Reinhard, Vernon, Bronnenkant, Deans, & Heimlich, 2007). Regardless of the reasons, the fact that more than 175 million people in the United States annually[2] choose to spend time in settings with non-domesticated living creatures is noteworthy[3]. E. O. Wilson, a preeminent entomologist and evolutionary biologist at Harvard University, author of two Pulitzer Prize-winning books, and recipient of numerous awards, calls the human interest in life and lifelike processes *biophilia* (Wilson, 1984, p. 1), and he argues that it comes from an inextricable connection between humans and all other forms of life based on a shared evolutionary history.

Aquariums and zoos support our human fascination with other living animals and, although science in zoological institutions may look different from school science, the absence of textbooks, tests, and school-like direct instruction means that science learning can be self-motivated, self-directed, and self-paced. Learning that is driven by personal interest and curiosity to answer personally-relevant questions can

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[2] The United States-based Association of Zoos and Aquariums (2009c) reports that over 175 million people visit accredited zoos and aquariums annually. The figure for the World Association for Zoos and Aquariums is over 600 million (2009).

[3] The AZA annual attendance figure of more than 175 million people is a greater annual attendance than for the four major professional sports (NBA, NFL, NHL, and MLB) combined (Hoovers - A Dun & Bradstreet Company, 2009; Wilson, 1984). This number is also more than twice the most recent census figure of 70,807,000 for school enrollment in kindergarten through the fourth year of college for people aged five through twenty one in the United States (U. S. Census Bureau, 2006).

develop into deep understandings and rich knowledge (Crowley & Jacobs, 2002).

Rationale for the Focus on Learning in Human-Dolphin Interactions

Some of the many challenges in studying what people learn in zoological settings are the wide variety of individually-selected experiences that are possible during any one visit, the large numbers of people, and the diversity of background knowledge, motivations, and levels of interest among those who spend time in these settings. In addition to independent viewing of animals and large-group, stadium-type shows or presentations, some zoological facilities offer opportunities to have close contact with animals in supervised activities, such as rides, feeding, touch tanks, and animal shows. A few facilities offer immersion experiences, such as a *dolphin encounter*, an activity in which visitors can go into the water to interact with dolphins under the guidance of professional animal trainers, and the activity being investigated in this research. Because the human-dolphin interaction activities have defined beginning and ending times, and also because the size of the group in each interaction session is limited to a small number that is managed by charging a separate fee, the dolphin encounter activity is a bounded phenomenon within the array of possible activities in aquariums, zoos, and marine parks, and thus seemed a manageable research focus.

Another reason for choosing interactions with dolphins as the focus of this study was the fact that dolphins are one of the most intriguing and beloved animals in the United States (Sickler, Fraser, Gruber, Boyle, Webler, & Reiss, 2006) and many

people seek opportunities to be near them (Bejder & Samuels, 2003; Samuels, Bejder, & Heinrich, 2000). Because of this mystique, I expected that people would be willing to participate in the research, despite the fact that they are typically on vacation or enjoying leisure time at the zoological sites that offer the interactions.

Finally, human-dolphin interactions have been a model for safe, popular, and revenue-producing activities in zoological facilities for over 20 years, and they have likely influenced an increase in close-contact opportunities with many different animal species over the past 15 years (Campbell, 2009, April; Sweeney & Acklin, 2008). Knowledge gleaned from studying human-dolphin interactions might inform other interaction experiences in aquariums and zoos.

Positionality

Through the course of my work in and around aquariums, zoos, and marine parks, I have watched many human-dolphin interaction sessions. I work as an educator for a zoological organization that is a pioneer of the human-dolphin interaction activity and that has been offering these experiences to the public in multiple locations for over 20 years. During the past two decades, I have visited almost all the zoological facilities in the United States that offer dolphin encounters, and I have participated in the interactions at numerous sites. Anecdotally, I have noted that that these experiences appear to be meaningful and to have a powerful impact on many people of all ages.

Research Question

Although the interactions had been occurring for two decades when I began

my research, there were no empirical studies that had examined them for evidence of

learning. In order to help establish baseline knowledge about the human-dolphin

interaction activities, the overarching research question in this investigation was: *what*

do people learn through interacting with dolphins in zoological facilities?

When I first started the project, this research question seemed deceptively

simple. However, the lack of commonly-accepted theoretical frameworks for research

in non-school settings, ambiguities about what learning means and what constitutes

evidence of learning, the intrinsic challenges of conducting research in public spaces,

and the intricate and sometimes-controversial nature of matters related to dolphins, all

contributed layers of complexity to the investigation. Additionally, although this study

focused on one primary question about learning, I was also curious to see if the

research would reveal the potential for the human-dolphin interactions to promote

awareness of ocean conservation issues and, especially, to trigger stewardship actions.

Definition of Learning

This study was based on an understanding that the term *learning* has a two-

pronged meaning. First, it means change through participation, a process of active

engagement with an activity or experience. The change may or may not be visible to

others, but the focus is on the dynamic process of transformation, as contrasted with

the possession of bits of knowledge that have been transmitted by another (Rogoff,

1995). The process of learning occurs in the personal, social, and cultural planes (Cole, 1996; Hein, 1998; Rogoff, 1995; Vygotsky, 1978) and is lifelong, life-wide, and life-deep (Banks, et al., 2007). Second, learning is a socially-mediated process in which individuals construct meaning through interacting with (a) signs, including speech, language, and gestures; (b) artifacts, that is cultural expectations and behavioral norms; and (c) tools, objects that have been created through human activity (Cole, 1996; Vygotsky, 1978).

In this social perspective, learning is viewed as much broader than just the cognitive mastery of facts, concepts, skills, or behaviors. Learning is the vehicle for a person's development of intellect, attitudes, preferences, skills, emotional states, and the accompanying sense of self that is incorporated internally and presented to the external world (Penuel & Wertsch, 1995; Vygotsky, 1978; Wenger, 1998). Lave and Wenger (1991) argue that "learning and a sense of identity are inseparable: They are aspects of the same phenomenon" (p. 115).

Learning involves a multiplicity of elements that interact with one another and because it is a continuous process that goes on throughout life, each experience is not discrete but "is assimilated or appropriated in terms of what has gone before" (Brown & Duguid, 1996, p. 2). Brown and Duguid further elaborate the point with an eloquent art metaphor that describes the process:

> [Learning] is a little like the addition of color to color in a painting, where the color that is added becomes inseparably a part of the color that was there before and both are transformed in the process. Of course, this paint metaphor is still misleading. Learning is not such a passive activity. The shade that events, circumstances, or interactions take on in the process of learning are determined through *active*

appropriation…It is…likely to involve many other peripheral features of which the teacher might be unaware, but which collectively make sense for the learner (Brown & Duguid, 1996, p. 2).

As the literature review in Chapter II shows, there is limited empirical research on learning in zoos. I have come to believe that one of the reasons that zoological facilities have been stymied and frustrated when trying to show that visitors are learning or have learned, is that most attempts have relied on one-sided models of learning, described as transmission of knowledge, solo discovery, or a compromise of the two called transfer of control over the curriculum, (Rogoff, 1995; Rogoff, Matusov, & White, 1996). According to Matusov and Rogoff (1995) learning is typically assessed in any of these one-sided models of learning in the following manner:

In one-sided approaches, learning is usually assessed by isolating the individual and applying a standard procedure to "measure" competence that tests original knowledge, applies a treatment, and again tests the resulting change in knowledge gained. Competence is regarded as obtaining pieces of knowledge (p. 102).

Such methods of assessing the learning of members of the public who visit zoological institutions are impractical, verging on impossible, because of the voluntary nature of the activity. Even though most educational research and evaluation in aquariums and zoos, historically, have focused on knowledge gain (Ogden & Heimlich, 2009), I argue that such one-sided models of learning will rarely be appropriate for studying the learning and activities that take place in these settings. Because the teacher-centered, transmission model of learning is so prevalent in Western-European schooling practices, it has long been the default benchmark against

which any learning, even that which takes place in most settings outside of school, has

been modeled and it is often extremely difficult "for holders of those [one-sided]

models to understand the coherence of an alternate such as the community of learners

model" (Rogoff, et al., 1996, p. 398).

The notion of a community of learners seemed particularly applicable to the

present investigation of learning in the human-dolphin interactions because the

activity inherently involved multiple people participating in collaboration with one

another. This idea is developed in the following discussion of the theoretical

framework of the research.

Theoretical Constructs that Guide this Research

Sociocultural Learning Theory

The sociocultural theory of learning holds that all human learning takes place

within a social and cultural milieu (Vygotsky, 1978). It emphasizes that:

> …meaning emerges in the interplay between individuals acting in
> social contexts and the mediators--including tools, talk, activity
> structures, signs, and symbol systems--that are employed in those
> contexts. Individuals both shape and are shaped by those mediators
> (Schauble, Leinhardt, & Martin, 1997, p. 4).

Sociocultural theory emphasizes that individuals develop through their

involvement in cultural practices (Cole, 1996; Rogoff, 2003). Cognitive development

in individuals is mediated by humans (e.g. parents, peers, and teachers) and by

symbols, such as language and the printed word. Not only are there different types of

mediation, but also there are different techniques of mediation (Kozulin, 2002).

Sociocultural theory emphasizes the cultural origins of development and takes into account the individual's internal learning processes, the social interactions, and the cultural activity where the personal and interpersonal activities take place (Rogoff, 1995).

Many researchers (Martin, 2004; Ogawa, Crain, Loomis, Ball, & Kim, 2006; Vadeboncoeur, 2006) view sociocultural theory as the appropriate framework for investigating learning in non-school settings, and it is the overarching theoretical framework for the research presented in this dissertation.

Situated Learning Theory

In this research study, the specifically-situated context of designed dolphin habitats in zoological facilities was integral to the learning activity. Because context was critical, situated learning theory was a more-focused sociocultural theoretical lens. Situated learning theory involves the individual, the social, and the context. It is a theoretical perspective on the social nature of learning that goes beyond individualistic aspects of cognitive focus to view learning as something that involves the whole person in relation to specific activities and in relation to social communities (Lave, 1996). In its emphasis of the context in which the learning takes place, situated learning theory holds that learners and context are inseparable aspects of learning.

Situated learning theory is a promising lens through which to view the human-dolphin interaction experiences because it encompasses the salient aspects of experiential learning theory (ELT), originally proposed by John Dewey (Anderson,

Boud, & Cohen, 1995; Hein, 1998, 2005, November; Russell, 1999a). ELT holds that

learning is a holistic process in which experience is both the foundation of and the

stimulus for learning (Kolb, Boyatzis, & Mainemelis, 2000, p. 227). Experiential

learning involves participation and emotional involvement (Jarvis, 1987), and

"continued reflection upon earlier experiences… add[s] to and transform[s] them into

deeper understanding" (Andreson, Boud, & Cohen, 1995, p. 225). Dewey emphasized

process and development over static concepts and also propounded that the value of

educational activities depends upon their social consequences as well as their

intellectual content (Hein, 2006). Dewey also believed that all experience is a

continuum with a past and a future, a concept that is integral to the typically-brief and

episodic visitor experience in aquarium, zoo, and museum-types of settings.

Situated learning theory also incorporates the important features of

constructivist learning theory where learners construct understanding by connecting

new information to their larger body of prior knowledge. Piaget is considered to be a

seminal figure in constructivist learning theory (Byrnes, 2001; Piaget in Phillips,

1995; Russell, 1999a; von Glaserfeld, 1989), and Dewey also promoted constructivist

views of learning (Hein, 1991, October).

A number of researchers have advocated for constructivism to be the model of

learning in museum-type settings (Anderson, Lucas, & Ginns, 2003; Hein, 1998;

Mintzes, Wandersee, & Novak, 1997). Hein argues that a constructivist theory

addresses both what is learned and how it is learned in these settings (Ansbacher,

1998; Hein, 1998), citing common characteristics that accommodate constructivism,

such as (a) lack of predetermined sequence, (b) learner-centered, (c) use of multiple learning modalities, (d) opportunities to make connections with familiar objects and concepts, and (e) it allows for diversity in knowledge and experiences.

This concept of constructivism is centrally embedded in situated learning theory since every aspect of development and learning is influenced by not only personal experiences and understandings but also by the social and historical context in which an individual is located. The sociocultural nature of constructivism is encapsulated in situated learning theory.

Community of Practice Theory of Learning

Situated learning theory further emphasizes the importance of participation in social practices that are shared by others, even if the individuals are not in physical proximity to one another (Cobb & Bowers, 1999). The more focused expression of this concept is a Community of Practice (CoP) theory of learning (Lave & Wenger, 1991). In this theoretical perspective, learning is something that involves the whole person in relation to specific activities and in relation to social communities:

> Activities, tasks, functions and understandings do not exist in isolation; they are part of a broader system of relations in which they have meaning…Learning thus implies becoming a different person with respect to the possibilities enabled by these systems of relations (Lave & Wenger, 1991, p. 53).

The CoP theory of learning seemed a particularly appropriate theoretical framework for this investigation, even though it had not been previously applied in a zoological setting. The human-dolphin interactions are collaborative activities and in

the CoP model, learning is considered to be an ongoing process of transformation of participation in collaborative endeavor that occurs simultaneously in the personal, interpersonal, and community planes. Learners "develop specific skills, commitments, knowledge, and their identity as they become proficient in practices that are valued in specific communities" (NRC,2009, p. 39). Both individual and collective activities are aspects of learning.

While human-dolphin interactions in zoological facilities are of relatively brief duration, the assumptions underlying a CoP still apply since this theory posits that each individual's participation is a product of previous experience and that their current participation will contribute to subsequent activities. Time is an integral aspect of all events. This model allows for diversity of knowledge, interest, and goals of multiple participants and for different types of participation. Newcomers can participate at the periphery of the community while more experienced people can participate more centrally.

Wenger (2008) argues that three characteristics are crucial for a CoP to exist: the domain (shared domain of interest), the community (joint activities), and the practice (a shared repertoire of resources, such as stories, tools, and ways of addressing recurring problems). In this study that was situated at three zoological facilities, the community identity of the participants came from a shared domain of interest in animals. The joint community activity was the human-dolphin interaction experience under investigation, as well as the animal-related activities that the participants practice in their individual lives, such as keeping pets. The practice, or

shared repertoire of resources and tools, were nature shows, previous visits to aquariums, zoos, and marine parks, books and field guides, whale and dolphin watching experiences in the ocean, other animal-related experiences such as snorkeling, SCUBA diving, and safari excursions.

I liken the CoP in the human-dolphin interactions to the more-recognizable world-wide community of birdwatchers. Birdwatchers, also not necessarily in proximity to one another, can be considered a community of practice because: (a) they have a shared domain of interest in birds; (b) they engage in birdwatching activities individually and with others, there are designated places for joint activities (e. g., meetings, classes, bird sanctuaries), and the activities range from impromptu and opportunistic to structured events; and (c) in their practice of birdwatching, birders share common tools, such as binoculars and spotting scopes, bird field guides, organizations, such as, the Audubon Society, and so on.

The birdwatching CoP seems a close model for applying the concept of a CoP to the animal enthusiasts in this study. Unlike business organizations, environments where the CoP has often been applied (Wenger, McDermott, & Snyder, 2002), the communities of birders and animal enthusiasts have no formal requirements or designation of membership, both communities have members who range from veteran experts to entry-level novices, and there is a wide diversity in members' interests, experiences, knowledge, and motivations. An underlying premise in this study is that, in the human-dolphin interactions, meaning making is a process that begins "…in a participation framework, not in an individual mind. This means, among other things,

that it is mediated by the differences of perspectives among the coparticipants"

(Hanks, 1991, p. 15).

In a traditional CoP model, Lave and Wenger (1991) describe communities in

which novices learn from experts in ongoing activities. Through practice in the

activities over time, the novices become increasingly proficient on their way to

becoming experts themselves. Eventually, again over time, they replace the old-timer

experts. Lave (1992) later acknowledges that the progression from novice to expert is

but one condition and possibility within a CoP. She states that, "knowledge and skill

are always to be found in practice in communities of practice" (1992, p. 3).

In the present study, the dolphin trainers contributed the expert perspective, but

these experts were not trying to teach the zoo visitors to become dolphin trainers. The

trainers guided the human-dolphin interactions as active co-participants and thus they

were included as research subjects, even though most research in informal learning

settings like zoos, aquariums, and museums has focused exclusively on the visitors.

The trainers in this study typically had more knowledge and skill than the other

participants, and they were cast in the role of teachers. Since the focus in this study

was on learning and, "If…we presume teaching has some impact on learners, then…

research [on teaching] would include the effects of teaching on teachers as learners as

well [as the effects of teaching on students] (Lave, 1996, p. 158). This study

endeavored to do what Lave proposes in her discussion:

> …that we treat both learners and teachers as subjects in their own
> right…[and look] at each as a located participant, and at their
> relations with one another, (rather than at some subject-less
> displacement of those relations into "instruction") if we wish to

understand teaching as participation in ongoing practice. Further, if teachers teach to affect learning, the only way to discover whether they are having effects and if so what those are, is to explore whether, and if so, how, there are changes in the participation of learners learning in their various communities of practice (1996, p. 158).

The trainers were legitimate participants in the activity, although they participated in a different role from both the visitors who entered the water and from the spectators who watched from the shore. The differences between the types of participation and also among individual participants were important factors to consider when determining what would constitute evidence of learning in this study.

Evidence of Learning in this CoP Model

The nature of the evidence of learning in this study was yet another dimension that added complexity to the research. It was likely that the different types of participants in the CoP would have different impressions, recollections, ideas, and feelings about the experience. It was expected that neither the different categories of participants nor the individuals within participant categories would learn the same things. Given the anticipated variation, how would learning be determined?

Because learning is viewed in this model as change through participation, I looked at participants' transforming identities and understandings in the human-dolphin interaction activities to see evidence of learning. Change might include (a) knowing certain information that was not known before, (b) becoming aware of perspectives and attitudes of which one was unaware before, (c) developing skills that were absent or previously undeveloped, (d) gaining greater confidence or a sense of

agency about one's potential, (e) seeing connections between and synthesizing information in new ways, (f) expanding affinities or shifting other aspects of one's identity, and so on. I recognized that there were likely to be many possibilities where examples could be found, including: (a) in participants' conversations and reports about the content, their feelings, their engagement, and their own sense of their changing identity or role in the community; (b) their ways of interacting with the tools and other mediators in the activity; (c) their ways of approaching and contributing to the endeavor; (d) their attitudes; (e) their leadership and support of others; and (f) their flexibility in relation to ongoing changes in the community. Neither a conscious intent to learn nor awareness of learning while engaged in the activity was necessary for learning to be evident by these measures.

Working From a Common Framework

Establishing a definition for learning and identifying what constitutes evidence of learning addressed two of the factors that have made it difficult, historically, to describe and measure learning in nonschool settings (Leinhardt & Crowley, 1998). Three recently-published frameworks for evaluating educational outcomes in non-school settings provided models for categorizing the evidence of learning in this study.

First, in 2004, the Museums, Library, and Archive Council (MLA) in England (2004) published a framework to guide museums, libraries, and archives in the United Kingdom in developing their education efforts and in determining evidence of the impact of their activities. It identified five key outcome categories: (a) knowledge

and understanding, (b) skills, (c) attitudes and value, (d) enjoyment, inspiration, and

creativity, and (e) activity, behaviour, and progression.

Second, and more directly relevant to work in the United States, in late 2008

the National Science Foundation (NSF) published a Framework for Evaluating

Impacts of Informal Science Education Projects (Friedman, 2008) that identified five

broad categories of potential impact: a) awareness, knowledge, or understanding; (b)

engagement or interest; (c) attitude; (d) behavior; and (e) skills. Nonschool science

education projects that get funded by NSF are expected to provide evidence of impact

in some of these categories. These categories are markedly similar and thus

compatible with those published by the MLA.

Finally, in 2009, the National Academies'[4] Committee on Learning Science in

Informal Environments reported on its in-depth examination of the potential for

science learning in nonschool settings, including in aquariums and zoos. This

comprehensive report, *Learning Science in Informal Environments: People, Places,

and Pursuits* (NRC, 2009), provides details of:

> the evidence of science learning across settings, learner age groups,
> and over varied spans of time; [identifies] qualities of learning
> experiences that are special to informal environments and those that
> are shared (e. g., with schools); and [presents] an agenda for research
> and development [of science learning in informal, out-of-school
> environments] (p. 2).

Although science learning in informal settings, like aquariums, zoos, and

museums, tends to be episodic and more fluid than in schools, this report emphasizes

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[4] The National Academies are comprised of The National Academy of Sciences, The National Academy
of Engineering, and The Institute of Medicine. The role of the National Academies is Advisors to the
Nation on Science, Engineering, and Medicine.

that these types of settings play an especially important role in generating excitement
and interest about science, in motivating people to want to learn more, and in getting
individuals to "think about themselves as science learners and develop an identity as
someone who knows about, uses, and sometimes contributes to science" (p. 4).

The report includes a framework that identifies six strands of science learning,
shown in Table 1.1, that articulate "science-specific capabilities supported by informal
environments" (p. 3). Strands two through five align with strands of science learning
in schools, as developed for Kindergarten through grade eight science learning in
Taking Science to School (National Research Council [NRC], 2007). Strands one and
six are considered to be of "special value in informal learning environments" (p. 4).

Table 1.1.

Strands of Science Learning: A Framework for Science Learning Goals from
the NRC's Committee on Learning Science in Informal Environments (NRC,
2009)

Strand 1	Developing interest in science
Strand 2	Understanding science knowledge
Strand 3	Engaging in science reasoning
Strand 4	Reflecting on science
Strand 5	Engaging in scientific practices
Strand 6	Identifying with the scientific enterprise

All three frameworks make it possible to describe the visitors' experiences in

informal environments in terms of potential outcomes or impacts that incorporate cognitive and affective development. They do not hold a narrow view of learning as simply the mechanics of gaining knowledge, a paradigm that has historically proven to be problematic. By specifying multiple categories of beneficial impact on visitors' development, these frameworks have validated an expanded view of learning within informal settings, including in the complex, sensory-rich, and leisure-time settings of aquariums, zoos, and marine parks.

The three frameworks described above became available sequentially during the course of the present research study and influenced its progress. The six-strand framework for examining and analyzing learning in informal learning settings (NRC, 2009) helped in organizing the categories of learning that became evident in this investigation and provided structure to the analysis of the data.

Chapter Summary

Zoological facilities are authentic and dynamic places for learning science. The human-dolphin interaction activity was selected to be studied from the range of possible learning experiences at these institutions because it is bounded by two conditions that made it a manageable research focus: (a) it has defined beginning and ending times, and (b) the numbers of participants are limited.

The purpose of this investigation was to better understand learning in zoological settings by investigating the specific research question: *what do people learn through interacting with dolphins in zoological facilities*? Learning was defined

as change through participation, a socially-mediated process of active engagement with an activity or experience in which individuals construct meaning through interacting with signs, artifacts, and tools (Vygotsky, 1978).

The Community of Practice theory of learning (Lave & Wenger, 1991) provided the theoretical framework for the research. It is a particular perspective within overarching sociocultural theory and also within situated learning theory that emphasizes that learning involves the whole person in relation to specific activities and in relation to social communities. The participants in this study comprised a "community" that shared a domain of interest in animals; they participated in the human-dolphin interactions as a joint community activity; and they shared a repertoire of animal-related resources, tools, and practices in their individual lives. The making of meaning was a process that was considered to begin, not in individual minds, but in a participation framework that included all participants, including the dolphin trainers.

Evidence of learning was expected to be found in participants' conversations and reports about the experience, and it was expected that learning would vary among the different types of participants and among the individuals within participant categories. New frameworks for education research in nonschool settings helped to organize and provide structure for the project, particularly *Learning Science in Informal Environments: People, Places, and Pursuits* (NRC, 2009).

Educational research investigations in aquariums and zoos do not typically focus on learning in human-dolphin interactions. It is also unusual to apply a CoP theoretical framework to research in these designed settings. A third atypical feature of

education research in zoological facilities is the inclusion of staff members as research participants (Beardsworth & Bryman, 2001). Careful consideration of the challenges of conducting research in these settings, coupled with comprehensive examination of previous work that will be reviewed in the next chapter, led me to conclude that this approach held promise for gaining new insights about what and how people learn in zoological settings.

II. CULTURAL-HISTORICAL AND RESEARCH CONTEXT

This chapter clarifies the terms related to research in nonschool settings and discusses the cultural-historical context of zoological facilities in which this study is situated. It describes the mystique of dolphins in American culture that influences this research. This chapter also presents an overview of visitor research in aquariums and zoos, and reviews research in several related bodies of literature that inform the study.

Evolution of Terms for Out-of-School Learning

Teaching and learning that take place within schools is commonly referred to as *formal education*. Most of a person's hours and days, however, are not spent in school, even during childhood and adolescence[5], and "learning takes place not only in school but also in the multiple contexts and valued practices of everyday lives across the life span" (Banks, et al., 2007, p. 5). The term *informal education* is a broad term referring to the learning that occurs outside of school settings, and includes everyday learning in the home, through recreation and media, in the workplace, and so on.

Museums, zoos, aquariums, botanical gardens, and nature centers are one subset of informal education settings. Most of the research about visitors to these leisure-time venues has been conducted in museums and, often, the term *museum* has been used in a generic sense to include all institutions with similar characteristics,

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[5] Banks, et al. have calculated that, based on 16 waking hours per day, children in grades one through twelve spend just 18.5% of their time in formal learning environments in the United States. For undergraduate students, the percentage is 7.7%, and for graduate students, it is 5.1% (2007, p. 9).

such as collections of novel objects in unique buildings and/or outdoor spaces, voluntary attendance by people of all ages, and multiple access points to the content rather than a linear progression that is typical in schools.

This field has used various terms to describe its environments, including *informal*, *nonformal*, and *free-choice* (Falk & Dierking, 1998). The term *designed settings* has recently emerged and refers to the informal environments that are intentionally designed for learning, such as museums, zoos, and aquariums (NRC, 2009). The NRC's report introduces the term by explaining that, "Learning in designed settings is highly participant structured, but also reflects the intended communicative and pedagogical goals of designers and educators" (p. 127). These institutions are typically experienced episodically; visitors' experiences there are brief, fluid, navigated freely by their personal choice; there is usually no or limited direct teaching; and learning is not assessed. Designed setting is the terminology that will be used in the present study.

Doing research on learning in designed settings is complicated, not only because visits are typically brief, but also because each individual's experience is affected by a multitude of internal and external factors, such as culture (Ogbu, 1995), personal history, prior knowledge, mood, motivation, expectations, companions, interest, and interactions with the staff (Adelman, Falk, & James, 2000; Bitgood, 2002; Falk & Adelman, 2003; Falk & Dierking, 1992; 2000; Hein, 1998). Thus the process of making meaning in these contextually-rich settings is multidimensional and complex, just as is the process of conducting research on that meaning making.

Cultural and Historical Context in Which this Study is Situated

Zoos and Aquariums as Cultural Institutions

Because mediation is the central mechanism of the sociocultural theories of learning, the process of learning in a Community of Practice (CoP) is imbued with the cultural dimensions of the situated context as it is embedded in the broader culture of the society and/or nation where the activity takes place. This research study was situated at three zoological facilities in the United States, institutions that, in general, offer significant venues for public education because of their unique animal collections, focus on education, and extremely large annual attendance numbers.

Contemporary aquariums and zoos have provided information about animals for many decades. However, changes in the broad social, political, and environmental realms have influenced a shift in educational focus. In the past 50 years, or so, the world's human population has dramatically increased and environmental degradation has become widespread. Wild places are disappearing and animal habitats, including the ocean, are under increasing pressure from human activities (National Academies of Science and Engineering [NASE], 2008). There has also been a shift in public sensibilities in the United States from an exploitive view to a more caring view about animals, influenced, in part, by "the enormous increase in the anthropomorphized portrayal of animals in printed, film, and electronic media" (Beardsworth & Bryman, 2001, p. 89). In response, most zoos and aquariums have increased their focus on conservation education related to the animals in their collections, with the goals of increasing conservation awareness and inspiring environmentally-sustainable

behaviors of the visitors (Beardsworth & Bryman, 2001; Clayton, Fraser, & Saunders, 2009; Falk et al., 2007; Fraser, 2007; Yalowitz, 2004).

The public has access to information about environmental issues not only from aquariums and zoos, but also in both the popular media (Bjerklie, 2006; Guggenheim, 2006; Guterl, 2009; Lehrer, 2008; Linden, 2000; Walsh, 2009) and in numerous scientific reports (Barnes & Milner, 2005; Baum, Myers, Kehler, Worm, Harley, & Doherty, 2003; Hansen, Sato, Ruedy, Lo, Lea, Medina-Elizade, & Change, 2006; Thomas, Cameron, Green, Bakkenes, Beaumont, Collingham, Erasmus, de Siqueira, Grainger, & Hannah, 2004, January 8). Despite these resources, surveys of public and student knowledge and opinions show that there is a widespread lack of knowledge about the ocean environment (American Association for the Advancement of Science, 2003; Ballantyne, 2004; Belden, Russonello, Stewart, & AmericanViewpoint, 1999; Brody, 1993a, 1993b, 1996; The Ocean Project, 2009) and about wildlife, even animals that are well-known and generally perceived in a positive light, such as dolphins (Barney, Mintzes, & Yen, 2005; Sickler, et al., 2006).

Reports of the effects of human activities on the environment indicate the need for greater stewardship efforts. This need comes at a time when our increasingly urban environment means that Americans have less access to and fewer experiences with nature. Research shows that personal experience with nature is a key factor related to stewardship attitudes (Brody, 1993a; Dunlap, Van Liere, Mertig, & Jones, 2000; Johnson, Bowker, & Cordell, 2004; Kellert, 2002; Mayer & Frantz, 2004; Murphy, 2002; Stern, Dietz, & Kalof, 1993; Thapa, 2005), and zoological facilities may be the

closest facsimile to nature to which most Americans, especially those living in urban centers, have access for personal experiences. Zoos and aquariums promote caring for animals, a schema that can lead to caring about nature more generally (Myers & Saunders, 2002; Vining, 2003).

Although there is a decline in the numbers of visitors to our national parks[6] (Pergams & Zaradic, 2008), zoos and aquariums continue to have increasing attendance rates (Association of Zoos and Aquariums [AZA], 2009c; Morey Group, 2006), and public opinion polls show that these institutions have widespread support (The Ocean Project, 2009), despite their critics (Bertram, 2004; Davis, 1997; Spotte, 2006) A recent large multi-institution research study (n=5500) shows that people in the United States value zoos and aquariums (Falk, et al., 2007). These institutions are regarded as places for having contact with and thinking about nature (Fraser, Gruber, & Condon, 2007), as well as being reliable sources of factual information about animals. The public expects them to promote conservation (Alliance of Marine Mammal Parks and Aquariums [AMMPA], 2005; The Ocean Project, 2009). These institutions have increasingly embraced an activist mission to influence the public to care about animals and their habitats and to increase stewardship behaviors.

Although a recent large national opinion poll of over 20,000 people shows that Americans care about the health of the environment, it also shows that most people do not understand what personal actions they can take to help improve the environment

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[6] There was a dramatic increase in visitation to U. S. national parks in the first three quarters of 2009, due to, it is speculated, an increased interest in regional, inexpensive vacations because of the economic recession and lower prices for automobile fuel (Associated Press, 2009, September 16).

(The Ocean Project, 2009). Because people (a) value the natural environment and (b) are bombarded with media input about environmental problems, it is likely that the topic of conservation is at a surface level of consciousness much of the time for certain segments of American society, particularly those with middle to upper income levels.

The Mystique of Dolphins

Although dolphins have been favorably represented in art and literature for more than two centuries (Stebbins, 1929), and there are historical accounts of beneficial human-dolphin interactions, such as cooperative fishing (Orams, 1997b), they also have been regarded as a food resource in many cultures, historically through the present day (Bearzi, Holcer, & di Sciara, 2004; Perrin, 1985; Reeves, Smith, Crespo, & Notarbartalo di Sciara, 2003; Takekawa, 1995; Van Waerebeek, Van Bressem, Félix, Alfaro-Shigueto, García-Godos, Chávez-Lisambart, Ontón, Montes, & Bello, 1997). Beginning in the 1950s, dolphins have become widely known in American culture through shows and exhibits at marine parks, aquariums, and zoos, and through television. Currently, dolphins are one of the most intriguing and beloved animals in our country (Sickler, et al., 2006).

One study (n = 70) in a two-and-a-half-year series of studies shows that there is "…underlying social consensus that dolphins are extremely intelligent animals with substantial cognitive abilities in the areas of language, creativity, memory, and, to a lesser extent, emotion" (Sickler, et al., 2006, p. 29). Perceptions that dolphins are highly intelligent may be the basis for their extreme popularity since research shows

that, "Animals that are close phylogenetically to humans, or that are physically,

behaviourally or cognitively similar to them, tend to evoke more positive affect than

those that are phylogenetically distinct or dissimilar" (Serpell, 2004, p. S147).

Dolphins are certainly very different in appearance from humans and from other furry

animals, such as pandas, that are appealing to many people in our culture, even though

dolphins are mammals with all requisite mammalian characteristics, but they are

perceived to be cognitively similar to humans.

Over the last 40 years, or so, there have been significant advances in scientific

knowledge about dolphin physiology and behavior, as well as knowledge and

technology for maintaining life-support systems for cetaceans under human care.

These advances, coupled with developments in dolphin training methods have made it

possible for people other than professional dolphin trainers to have safe interactions

with dolphins within controlled settings, a concept unheard of thirty years earlier.

Opportunities for the public to interact with dolphins in a zoological setting

emerged in the United States a little over twenty years ago. Although all marine

mammals in zoological facilities are heavily regulated by federal agencies, the first

four facilities that offered human-dolphin interactions, known then as *swim-with-the-

dolphin* (SWTD) programs, in the United States underwent heightened scrutiny by a

federal-government monitoring program resulting in acknowledgement that the

operations ensure the animals' welfare and human safety (Samuels & Spradlin, 1995).

One of the conditions inherent in SWTD programs is that the animals must

have access to designated refuge space in their habitat should they choose not to

interact with visitors at any time. Scientific research has shown that dolphins that participate in interactions with humans do not show interaction-related signs of stress, whether measured by physiological parameters (Dold, Sweeney, Reidarson, McBain, & Monfort, 2000, May) or behavioral changes (Kyngdon, Minot, & Stafford, 2003; Miller, Mellen, Greer, & Kuczaj, 2008, September; Trone, Kuczaj, & Solangi, 2005). Today, nearly every facility in the United States that has bottlenose dolphins offers dolphin interaction opportunities for the public (Campbell, 2009, April), and several facilities offer interactions with other marine mammal species (Campbell, 2009, April), such as beluga whales and sea lions.

Within the last 25 years, there also has been an emergence of dolphin interaction sites in the wild, perhaps stemming from the first reports of the human-friendly wild dolphins at the Monkey Mia site in Western Australia in the 1980s (Connor & Smolker, 1985). These activities rapidly increased (Bejder & Samuels, 2003; Samuels, Bejder, & Heinrich, 2000), and research on human interactions with dolphins in the wild, coming primarily from Australia and New Zealand, shows a range of findings that include the following: (a) ecotourism boat traffic can be disruptive to the animals (Lusseau & Higham, 2004; Scarpaci, Dayanthi, & Corkeron, 2003); (b) some dolphins avoid swimmers (Constantine, 2001); (c) in a study of swimming with wild dolphins (n = 14), some people reported that it was an uplifting experience (Curtin, 2006); DeMares (2000) identified five themes in his study of six subjects who reported having "peak" experiences with marine mammals: reciprocity of process, intention, connectedness, aliveness, and harmony; and (d) education efforts

at a known site for habituated dolphins influenced positive change in the behavior of

tourists (Orams, 1997a; Orams & Hill, 1998). One study (n = 99) looked at self-

reported feelings of well-being and anxiety among those who swam with dolphins in

the ocean and those who swam without dolphins and concluded that even the

anticipation of swimming with dolphins increased feelings of well-being, and that

swimming with dolphins may lower anxiety (Webb & Drummond, 2001).

The value of personal experience is a cornerstone of environmental education

(Bögeholz, 2006; Hedges, 2004; Kola-Olusanya, 2005) and the central tenet in the

study of significant life experiences (Chawla, 1998). Significant life experiences with

wildlife have been called "profound" (Smith, 2007) and also "peak" events (DeMares,

2000). Experiences with dolphins and whales are particularly captivating to many

people, as evidenced by the large number of cetacean-centered tourist attractions,

particularly in Australia and New Zealand (Bulbeck, 1999; Constantine, 2001; Finkler

& Higham, 2004; Lusseau & Higham, 2004; Scarpaci, et al., 2003), and the popularity

of dolphin encounters at zoological facilities in America and many other locations

around the world.

In the United States, the Marine Mammal Protection Act (MMPA) of 1972

(United States Congress, 1972) prohibits the feeding or swimming with dolphins in

the wild because those activities are considered to be harmful to the health and welfare

of wild marine mammals (Samuels, Bejder, & Heinrich, 2000). Such activities are also

known to be dangerous to humans (Spradlin, Drevenak, Terbush, & Nitta, November).

Nonetheless, there are two primary locations in the United States where commercial

wild-dolphin swim operations still occur: (a) in the southeast region (primarily in Florida) and (b) throughout the Hawaiian Islands (Spradlin, et al., 1999, November). Clearly, there is a strong interest in these activities, even when they are illegal.

Interacting with dolphins in zoological facilities under the guidance of experienced animal trainers has been determined to be a safe activity for both the dolphins and the humans (Samuels & Spradlin, 1995). It neither risks harm to wild dolphins nor breaks the law. It is significant to note that, in order for public-display zoological facilities to have marine mammals in their collections, they are required by federal law, the MMPA, to offer "a program for education or conservation purposes that is based on professionally recognized standards of the public display community" (United States Congress, 1972). This unprecedented mandate adds to the significance of this research study because there has been very limited educational research that is specifically related to marine mammals in public-display zoological facilities.

A recently-completed dissertation about human-dolphin interactions at zoological facilities focused on education. Using a repeated-measures survey design, Miller (2009) found that both the visitors who passively watched dolphin shows (n = 462) and visitors that participated in human-dolphin interactions (n = 331) showed short-term increases in conservation-related knowledge, attitude, and behavioral intentions immediately after their experiences. Follow-up phone interviews three months later showed that a subset of the passive group (n = 164) sustained their increases in knowledge and reported conservation behaviors but their attitudes and

behavioral intentions returned to entry levels. The interaction subset (n = 128) sustained increases in all measured categories.

Issues regarding animals, in general, can invoke strong feelings, and dolphins are one of the most prominent lightening rods of controversy. Since individuals' opinions on animal "rights" spread along a continuum (e. g., Sunstein, 2004), it is not surprising to hear criticism against human-dolphin interactions in zoological facilities (e.g., Curtin, 2006; Curtin & Wilkes, 2007; Frohoff & Packard, 1995). In one such study, Stewart (2006) used a naturalistic case-study interview approach to compare participants' experiences in human-dolphin interactions in a zoological facility (visitors n = 76, trainers n = 13) to those in the wild (n = 17). Her findings show that participants in both formats enjoyed and felt they benefited from the experience; however, Stewart interpreted the findings to conclude that it is unethical to have dolphins under human care and preferable to interact with wild dolphins, if one is to engage in that activity. None of the studies cited in this paragraph focused on what people learn in the interactions.

In American culture, people give numerous reasons why they seek experiences with animals, especially dolphins (Amante-Helweg, 1996; Wilson, 1984). In this broad context, one wonders if the human-dolphin interactions are, to extrapolate from Craik, "a fad or a new social form" (2004, p. 27). Based on their growing world-wide popularity (Bejder & Samuels, 2003; Higham, Bejder, & Lusseau, 2009; Samuels, et al., 2000), and the evidence presented in this study and others (Miller, Zeigler-Hill, Mellen, Greer, Koeppel, & Kuczaj, 2008, September; Miller, 2009; Orams, 1997b;

Smith, 2007; Stewart, 2006) of the powerful impact these experiences have on many

participants, interactions with dolphins appear to be a significant phenomenon for a

certain segment of society. Arguably, the successes of the human-dolphin interaction

programs at zoological facilities have also inspired an increase in contact opportunities

with many other animal species at zoos and aquariums (Campbell, 2009, April;

Sweeney & Acklin, 2008).

Research that Informs this Study

There are numerous bodies of research that inform this research study of

learning in zoological contexts.

Research on Science Learning in Schools Relevant to Designed Settings

Research on school science education contributes some general concepts about

effective teaching and learning methods that are applicable to education in zoological

facilities. For example: (a) a positive, relaxed environment that allows for student

interactions and participation in activities facilitates learning (Fraser, 1994);

(b) emphasis on major conceptual themes is better than accumulating amounts of

factual information (Bybee & DeBoer, 1994); (c) enjoyable science experiences build

positive attitudes that enhance learning (Simpson, Kobella, Oliver, & Crawley, 1994);

and (d) a student-centered approach to learning within a social context is superior to

teaching to cover the content (Tobin, Tippins, & Gallard, 1994).

One study on science learning in eighth grade physics classrooms (n= 24)

suggested that positive emotions are important in the acquisition phase of learning, that anxiety plays an ambiguous role in the practice phase, and that joy in learning and interest are frequently linked to successful learning processes, not necessarily to the subject matter (Laukenmann, Bleicher, Fuss, Glaser-Zikuda, Mayring, & von Rhoneck, 2003). The implications of this study are that, even when confronting difficult subject matter, such as physics, successful learning is facilitated by an environment that stimulates and nurtures the learner's interest, and by positive emotions. Generating excitement, interest, and motivation are attributes that have been identified to be particular strengths of informal learning environments, such as the designed settings of aquariums and zoos (NRC, 2009).

Research in Designed Setting: Challenges and Tensions

The differences between school and designed education settings are significant but because schools have been the standard model for education long before museums, zoos, and aquariums made the transition from repositories of collected objects or menageries to education and conservation centers (Ballantyne, Packer, Hughes, & Dierking, 2007; Rabb, 2004), researchers have struggled with how to define and measure learning in designed learning institutions (Dierking, Burtnyk, Büchner, & Falk, 2002; Dierking, Ellenbogen, & Falk, 2004; Falk, 1999; Leinhardt & Crowley, 1998; Martin, 2004; Rennie & Johnston, 2007). The field of visitor studies in designed settings has also wrestled with finding common theoretical frameworks and agreed-upon methodologies (Allen, Gutwill, Perry, Garibay, Ellenbogen, Heimlich, Reich, &

Klein, 2007; Martin, 2007). Research investigations have taken behaviorist, cognitive, and sociocultural perspectives and focused on a variety of different units of analysis, including individuals, places (e.g. a specific exhibit), and groups of people.

Some critics question the quality of educational efforts in designed settings (Beardsworth & Bryman, 2001; Davis, 1997; Hyson, 2004). They suggest that these types of science centers water-down science concepts for the sake of getting people to attend and have fun (Tlili, Cribb, & Gewirtz, 2006). In contrast, others view the blending of education and entertainment to be, "not only compatible, but synergistic, in the context of educational leisure settings" (Packer & Ballantyne, 2004, p. 68).

Studies to find out if visitors perceive zoos and aquariums as places to learn show mixed findings. One study shows that although visitors (n = 250) do not necessarily associate zoological facilities as places to learn, the same people acknowledge that "there are lots of opportunities to learn here" (Packer & Ballantyne, 2002, p. 192). Another study indicates that many people whose prime purpose at arrival was for entertainment still state that they perceive the zoo to have a role in education (Tofield, Coll, Vyle, & Bolstad, 2003). A study of 750 adults who visited zoos frequently when growing up reveals that they place greater value on the educational benefits of zoos than those who didn't go to zoos as often (Holzer & Scott, 1997). One recent multi-institutional study (n = 5500) shows that, "Forty-two percent [of visitors] commented on the important role that zoos and aquariums play in education" (Vernon & Boyle, 2008, p. 7).

When reviewing zoo and aquarium visitor studies, in particular, questions arise

about research rigor and the scholarly level of peer-review. Many studies have been conducted for the proprietary use of individual institutions and not published. Others are found in less-widely circulated publications that may also be linked to trade organizations or advocacy groups; and some are considered grey literature, and/or cannot easily be located through library and Internet searches (Churchman, 1987, August; Dierking, et al., 2002). At the present time, "…there is no dominant, peer-reviewed journal in North America for zoo and aquarium educators; indeed there is no academic journal dedicated to zoo and aquarium education research" (Ogden & Heimlich, 2009). Within the zoo and aquarium literature, there is widespread agreement that there is limited empirical research on learning in or the impact of aquariums and zoos (Churchman, 1984, September; Dierking, et al., 2002; Falk, et al., 2007; Hooper-Greenhill & Moussouri, 2000; Spotte & Clark, 2004; Walters, 2006; Wilson & Zimmerman, 2006).

Research in Designed Settings: Design Features that Facilitate Learning

A significant focus of visitor research in museums, zoos, and aquariums has been to study visitor behavior, such as pedestrian traffic patterns and how much time individuals spent at various exhibits (Bitgood, 2002; Falk & Dierking, 1992; Serrell & Adams, 1998; Yalowitz & Bronnenkant, 2009). The behaviorist perspective involves observing, tracking, timing, and surveying visitors with the assumption that the longer visitors stay at an exhibit, the greater the learning impact.

From such studies at zoological facilities, we know that the public spends more

time at exhibits where the animals are visible (Davey, 2006) and in large viewing

areas (Moss, Francis, & Esson, 2008); and more time watching animals that are: (a)

active (Bexell, Jarrett, Lan, Sandhaus, Zhihe, & Maple, 2007; Bitgood, Patterson, &

Benefield, 1988; Margulis, Hoyos, & Anderson, 2003), (b) interacting with other

animals (Price, Ashmore, & McGivern, 1994; Tunnicliffe & Scheersoi, 2009), (c) with

their babies (Bitgood, et al., 1988), (d) large (Ward, Mosberger, Kistler, & Fischer,

1998), (e) "flagship species"[7] (Francis, Esson, & Moss, 2007), (f) displayed in

naturalistic exhibits (Davey, 2006; Finlay, James, & Maple, 1988; Nakamichi, 2007;

Price, et al., 1994; Tofield, et al., 2003), and (g) displayed in close proximity to

visitors (Bitgood, 1999; Bitgood, et al., 1988).

Coe (1985), an architect who applies theories of human behavior to zoo design

with the intention of establishing environments that predispose zoo visitors to learn

from and enjoy what they experience, contends that the positioning of visitors and

animals in zoos projects unconscious communication of biological rank. If visitors are

positioned higher than the animals, it connotes dominance. He suggests that relative

position enhances or retards our ability to learn from animals.

The conceptual design of the human-dolphin interaction experiences in this

study, where visitors are eye-to-eye and in the water with the animals, has seven of ten

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[7] Flagship species are defined by the Association of Zoos and Aquariums as "well-known animals
which arouse strong feelings in the public for the preservation and protection of the *in situ* population
and their habitat, including the giant panda, California condor, and lowland gorilla" (Association of
Zoos and Aquariums [AZA], 2009b).

intrinsic qualities[8] that Coe says, "enhance an animal's subjective position in the eyes of the zoo visitor" (1985, p. 204). The seven qualities are:

1. Person enters perceptual space already occupied by animal.

2. Person locates on edge of space, animal in center of space.

3. Person looks up at animal.[9]

4. Person in novel, unfamiliar setting sees animals in setting appropriate to it.

5. Person alone or in small group appears to be surrounded by animals.

6. Person sees dangerous animal with no visible barrier between them.

7. Person discovers animal very close at hand.

Although some of these attributes are included in a number of multi-species naturalistic zoo exhibits, such as Tiger River at the San Diego Zoo in California and Tropic World at the Brookfield Zoo in Chicago, visitor movements typically are confined to pathways that weave through or near the animals' habitats with clear delineation between human and animal spaces. In the study of learning in human-dolphin interactions that is presented in this dissertation, the authenticity of fully entering into the animals' aquatic habitat adds a dimension that got the participants full attention and involved their bodies, minds, and emotions.

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[8] The three additional exhibit design elements are: (a) person hides, sees animal in full view; (b) person encounters animal by surprise; and (c) person (diurnal) encounters animal in nocturnal habitat.

[9] In the human-dolphin interactions, they are on the same plane.

Research in Designed Settings: Audience Focus

Historically, a great deal of the research and evaluation in designed settings has

focused on children (Leinhardt & Crowley, 1998), especially elementary school

groups (Adams, 2006; Anderson, Kisiel, & Storksdieck, 2006a; Anderson & Lucas,

1997; Cox-Petersen, Marsh, Kisiel, & Melber, 2003; DeWitt & Storksdieck, 2008;

Falk & Dierking, 1997; Griffin, 2004; Klein, 2006; Lelliott, 2009). These groups are

generally manageable research subjects because school field trips are bounded

activities that have a well-defined beginning and end, the groups' activities are often

structured in some way by the classroom teacher or the site education staff, and the

classroom teachers are generally cooperative with assessment measures.

Studies of school groups at zoological facilities show that students make both

cognitive and affective gains. For example, (a) preschool students' (n = 20) knowledge

and interest in sea creatures was stimulated by a school excursion to a marine-oriented

zoological facility (Hedges, 2004); (b) three to twelve year-old children (n = 49) who

visited a zoo with their child-care center showed that both age and experience were

factors in the children's understanding of zoo themes and abstract concepts, such as

the need to preserve animals (DeMarie, 2001; DeMarie, Norman, & Walker Abshier,

2000); and (c) fourth grade students (n = 292) who handled live marine invertebrates

demonstrated gains in short- and long-term affective learning in contrast to students

who handled only dried specimens (Sherwood, Rallis, & Stone, 1989).

Other studies of school groups in zoological settings show that: (a) teachers

(n = 34) of fifth grade students reported that their pupils remembered concepts and

strengthened their inquiry skills in the pre/post trip lessons at school in conjunction with classroom and dolphin-viewing experiences during the field trip (Sweeney, 1995); (b) 67 fifth graders retained more information from an interpretative presentation about rhinoceroses than from a facts-only presentation (Visscher, Snider, & Vander Stoep, 2009); (c) after watching a birds-of-prey show, fifth graders (n = 393) showed a significant shift toward pro-conservation attitudes (Yerke & Burns, 1993, September); and (d) a study of cognitive and affective benefits of self-guided workstations about birds showed that the 77 sixth grade students in the treatment group scored significantly higher than the 26 control group students on information retention one week and eight to nine weeks later, but that the control group reported higher interest, well-being, and contentedness (Randler, Baumgartner, Eisele, & Kienzle, 2007).

School teachers, a visitor segment related to children, have also been studied in designed settings (Anderson, et al., 2006a; Anderson, Lawson, & Mayer-Smith, 2006b; Melber & Cox-Peterson, 2005). There is also research on the experiences of families with children in designed settings (Allen & Gutwill, 2009; Ash, 2003; Borun, Chambers, & Cleghorn, 1996; Crowley & Jacobs, 2002; Dierking & Falk, 1994; Ellenbogen, Luke, & Dierking, 2004; Jeffery & Wandersee, 1996, March-April; Rosenthal & Blankman-Hetrick, 2002; Sandifer, 1997; Shine & Acosta, 2000).

For example, investigators studying family learning in an aquarium (n = 13 families) found evidence of cognitive gain in the adults, as "characterized by declarative knowledge or explicit fact recollection" (Briseno-Garzon, Anderson, &

Anderson, 2007, p. 307), and also in the social and affective realms. Another study of English-speaking and Spanish-speaking family visitors focused on observing their social activities and listening to their conversations using, as the unit of analysis, a significant-event construct, during two visits to an aquarium six months apart. Findings showed that the families (n = 8) used a variety of mediating tools at the aquarium: the adults asked their children questions, and family members collaborated to explore and to actively probe for appropriate scientific information (Ash, 2004).

Most research on learning in designed learning institutions has focused exclusively on the visitors (Dierking, et al., 2004; Hein, 1998; Rennie & Johnston, 2007). However, there is emerging interest in studying the interactions of the visitors with the facilities' personnel in public spaces (Abu-Shumays & Leinhardt, 2002; Rennie & Johnston, 2007), and in studying the affordances and constraints on staff learning (Abu-Shumays & Leinhardt, 2002; Mony & Heimlich, 2008; Smith, 2009).

One example of a general visitor study (n = 223) showed that aquarium visitors self-reported that they had learned through interacting with touch-screen information systems or posters next to animal exhibits (Lin, 2007). Another study with 600 visitors showed that using a hands-on touch table about the biology, ecology, and conservation of bearded vultures resulted in knowledge gain both immediately after the zoo visit and two months later (Lindemann-Matthies & Kamer, 2006). Another aquarium study, however, utilized pre- and post-visit knowledge-based surveys (n = 247) to show only a moderate experimental result in knowledge gain (Spotte & Clark, 2004).

Research in Designed Settings: Focus on Themes

Some visitor-studies research has focused on specific themes. For example, several studies have looked at the reasons that people cite as their motivations for visiting designed settings. These studies show that such motivations, also described as visitors' *entry agenda*s, strongly affect the outcome of the experience (Anderson, Piscitelli, & Everett, 2008; Anderson & Shimizu, 2007a; Brise˜no-Garzon, Anderson, & Anderson, 2007; Falk, Moussouri, & Coulson, 1998; Roschelle, 1995). Research on memory of museum experiences (Bamberger & Tal, 2008; Knapp, 2000; Medved & Oatley, 2000) or long-term memory of large-scale episodic experiences, such as a world's fair (Anderson, 2003; Anderson & Gosselin, 2008; Anderson & Shimizu, 2007a; Anderson, Storksdieck, & Spock, 2007), show that long-term memories tend to be highly idiosyncratic as well as tied to entry agenda.

Research on the Theme of Interactivity

One of the research themes in designed settings of relevance to the present study is interactivity, since the human-dolphin interaction activity is interactive by design. Most of the research on this theme has been based in science museums and science centers (Hooper-Greenhill & Moussouri, 2000) where it has mainly focused on manipulative exhibits where visitors typically explore and experiment at their own pace. Interactivity, defined in terms of reciprocity (McLean & Pollock, 2007), is considered to be a key attribute of engaging learning experiences (NRC, 2009).

One tracking study (n = 47) on interactivity at a science museum found that

technological novelty and open-endedness of physical exhibits held visitors' interest longer than at exhibits not possessing such qualities (Sandifer, 2003). In another study at an interactive science center, follow-up interviews of adults and children (n = 79) showed that, although the visitors' memories of the exhibit were episodic, the respondents reported having reflected on their experiences at the science center and having related their experience to existing knowledge and subsequent experiences, such as television programs, after the visit (Stevenson, 1991). A study of 392 visitors at an interactive science museum found that combining staff interpretation with an interactive exhibit was more effective than independent exploration in facilitating visitors' understanding of the mechanism of shadow creation (Allen, 1997). Allen also found that visitors' preconceptions are robust and that during interviews, only rarely, did they revise their thinking in the face of disconfirming evidence.

Research on the Theme of Close-Contact with Animals

A subset of the interactivity theme that relates specifically to zoological facilities is research about close contact with animals. One study shows that families' (n = 14) interactive experiences at an aquarium's touch pool and at exhibits involving simple actions, such as pushing a button or lifting a door, were more memorable than non-interactive exhibits (Jeffery & Wandersee, 1996, March-April). Kreger and Mench (1995) discuss how interactive experiences with animals at zoological facilities are extremely popular and, "The fact that visitors are willing to pay for these interactions indicates that this human-animal bond may be the most effective way for

the zoo to communicate its educational message to the visitor" (p. 155).

Some studies provide evidence that visitors both seek and benefit from close contact with animals, including watching other people interact with the animals. For example, an investigation about visitors at a clouded leopard exhibit (n = 150) and a study of visitors at an exhibit of Asian small-clawed otters (n = 398) showed that the visitors stayed longer at the exhibits, and reported more positive zoo experiences when they were able to watch some kind of a trainer demonstration that was accompanied by interpretation (Anderson, Kelling, Pressley-Keough, Bloomsmith, & Maple, 2003; Povey & Rios, 2002). Swanagan (2000) found that of 350 zoo visitors, those who watched an elephant demonstration and had some exposure to a bio-fact cart were more likely to take conservation action in the form of writing letters to legislators about elephant legislation than visitors who did not have the more active experiences.

Shows and demonstrations with birds, sea lions, and other species appear to be very common in the United States, based on seeing them promoted on the Web sites of many zoos and aquariums. One investigation at a children's zoo conducted interviews both at the zoo and six weeks later by phone and found that retention of educational messages was "as high as 83%" (Heinrich & Birney, 1992, p. 113) from watching an "Animal All-Star Show."

Research about close-contact experiences with animals in aquariums and zoos is limited and the conditions have not been directly parallel to the immersion activity in the present study. Nonetheless, the studies that showed that these experiences can have a positive impact on visitors' knowledge gain and enjoyment suggested that it

was likely that the human-dolphin contact activity would also have a positive impact.

<u>Research on the Theme of Identity</u>

The theme of identity is particularly relevant to the present study. Research about identity, as it relates to learning in designed settings, shows that the ways people see themselves as learners are related to their motivations, interests, expectations, and prior knowledge (Falk, Heimlich, & Bronnenkant, 2008; Falk, et al., 2007; Fienberg & Leinhardt, 2002; Paris & Mercer, 2002; Rounds, 2006; Stainton, 2002). Rounds calls *identity* an "elastic word" (2006, p. 133) and considers that a person's identity is a process that unfolds in time, rather than a stable entity.

Identity studies include examination of situational identity, such as serving as a facilitator for a child's experience at an aquarium, and more permanent constructs pertaining to self, such as being a bird-watching hobbyist (Macdonald, 2002) or a learner of science (Brickhouse, Lowery, & Schultz, 2000; Brown, Reveles, & Kelly, 2005; Kozoll & Osborne, 2004).

Several studies that examined motivations for visiting designed settings show that the nature of visitors' motivations directly correlates with their behaviors during the visit, as well as with the outcomes and memories of the experiences (Anderson, et al., 2007; Falk, et al., 1998; Packer & Ballantyne, 2002; Pekarik, Doering, & Karns, 1999). Falk and his colleagues (2006, 2008, 2009) have described five visitor

identities[10] that relate to motivation to visit museum-type designed settings, including

aquariums and zoos. They call them *Explorer*, *Facilitator*, *Experience Seeker*,

P*rofessional/ Hobbyist*, and *Recharger[11]*. Falk contends that these identities are

situational and that, for all of these types, the visitor experience "begins with a desire

to fulfill some inner identity-related need. These identity-related needs, more than

demographics or social group or even museum content, largely drive the nature of the

visit" (2009, p. 61).

Based on comprehensive review of the literature and his own extensive body

of research in museum-types of institutions[12], Falk has also concluded that, while

visitors may not include the words *education* or *learning* in their stated reasons for

visiting a designed setting, the public perceives these institutions "as optimum settings

for free-choice learning. Museums are where the world of leisure and learning

intersect" (2009, p. 56). Because these facilities are viewed as educational settings,

"Why mention something that is so obvious" (Falk, 2009, p. 56)? He believes that,

"the motivation of learning/education is so intrinsic to museums that they are more or

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[10] *Explorers* are curiosity-driven to explore new and interesting places. *Facilitators* are socially motivated; they want to enable the experience and learning of others in their social group. *Experience Seekers* want to experience the special aspects of what they consider to be an important setting. P*rofessionals/ Hobbyists* feel a connection between the content of the setting and their profession or hobby. *Rechargers* want to have a contemplative or restorative experience (Falk, 2008).

[11] The category of *Recharger* was formerly called *Spiritual Pilgrim*. Falk explained that he relabeled this category based on persistent concerns that his "own very secular view of 'spirituality' and 'pilgrim' are not universally shared" (Falk, 2009, pp. 259-260).

[12] Falk uses the word *museum* in a generic sense to refer to designed environments, such as aquariums, botanical gardens, museums of all types, marine parks, nature centers, science centers, and zoos. Over the course of his prolific career, he has done visitor research in most, if not all, of these settings and draws upon this broad experience in his general statements about museums.

less embedded within each of my five categories" (2009, p. 64).

In a recent study at twelve zoological facilities, Falk and his research team (2008) used multiple methods, including pre- and post-visit surveys (n = 1555), face-to-face interviews with a subset of subjects (n = 356), and telephone or email follow-up interviews seven to eleven months later with a smaller subset (n = 83) to find that visitors' identity-related motivations clearly affected conservation knowledge gain, and conservation and zoo/aquarium attitudes. They concluded:

> As we hypothesized, categorizing visitors as a function of their identity-related visit motivations could be used as a conceptual tool for capturing important insights into how visitors make sense of their museum experience: prior to arriving, during the experience, and over time as they reflect back upon the visit (p. 71).

In another, three-year, multi-institutional study of how zoos and aquariums have an impact on the public (n=5500), Falk and his team of researchers (2007) used multiple methodologies to show, among other things, that a majority (57%) of public visitors said that their experience at one of the studied zoos or aquariums strengthened their feeling of connection to nature. These findings made me wonder if feeling a stronger connection to nature might prompt aquarium and zoo visitors to identify themselves as nature advocates. Also, do the feelings of connection to nature lead to increased pro-environmental behaviors? These questions led beyond the literature in designed settings to the literature related to conservation behavior.

Research on Conservation Attitudes, Knowledge, and Behavior

In the present research, my interest in assessing the potential of the human-

dolphin interactions to influence conservation attitudes and stewardship actions led to

the literature in conservation psychology, a field that specifically focuses on cognitive

and behavioral outcomes that lead to protection of the natural environment (Saunders,

2003). This emerging field proposes to:

> …create stronger connections between the natural and social sciences,
> between research and practice, and between psychology and the other
> social sciences. The purpose of such a network is to conduct
> psychological research that is directly oriented toward the goal of
> environmental sustainability (Saunders, 2003, p. 137).

Work in this field suggests that, although people have access to a broad

spectrum of information about the environment and conservation, knowledge alone is

not sufficient to produce change in behavior (Grob, 1995; Schultz, 2002). This is

because, in part, "people do not necessarily function in rational, economic ways"

(Kurz, 2002, p. 259). In the context of environmental concerns, Schultz (2002)

differentiates between *procedural* knowledge, the most common focus of educational

efforts to promote recycling, for example, and *normative* knowledge that he says is a

good predictor of behavior. Other authors point out that basic knowledge about

environmental issues is necessary for action but that advanced knowledge does not

necessarily lead to increased action (Fransson & Garling, 1999; Kollmuss &

Agyeman, 2002).

One approach to trying to understand what influences conservation behavior

has been the use of various instruments to measure concern about the environment,

such as the New Ecological Paradigm (NEP) measurement (Dunlap, et al., 2000;

Johnson, et al., 2004; Stern, Dietz, & Guagnano, 1995; Wiidegren, 1998). This

instrument has been used to identify respondents' beliefs about self (egoistic), other people (altruistic), and the broad natural world (biospheric). Schultz (2001) used the NEP along with other measures in four studies (n = 1010; n = 1005; n = 148; n = 1700) to analyze the relationship between values and environmental concerns. From these studies, he concluded that the three different areas of concern--egoistic, altruistic, and biospheric--are, indeed, distinct. An important implication of this work is that a more biospheric-oriented person would be more likely to engage in environmentally responsible behavior (ERB) than would an egoistic person.

Schultz suggests that attitudes about environmental issues may be the result of more general underlying values, an idea known as a values-based theory (Stern & Dietz, 1994). For example, in a study of 349 college students, Stern, Dietz, and Kalof (1993) found that beliefs about consequences for each type of valued object (e.g. self, other people, and the biospheric world of nature that includes non-human species) independently predicted individuals' willingness to take political action.

Others have also found that value structures and cultural values influence environmental attitudes and behaviors. For example, Hansla, Gamble, Juliusson, and Garling (2008) found in a study of 494 adults in Sweden that environmental concerns were related to awareness-of-consequence beliefs for oneself, others, and the biosphere, and that each of these beliefs corresponded to specific value types (consequences to self corresponded to power; consequences to others corresponded to benevolence; and consequences to the biosphere corresponded to universalism). Another study, also set in Sweden (n = 1400), examined four variables: (a) general

values (described in two dimensions: openness to change versus conservation); (b) self-transcendence (serves collective interests) versus self-enhancement (serves individual interests); (c) environmental problem awareness; and (d) personal norms, such as frequency of engaging in specific stewardship behaviors. Findings showed that personal norms were derived from self-transcendent and ecocentric values (belief that the environment has intrinsic value and, therefore, should be protected), and activated by awareness of problems (Nordlund & Garvill, 2002).

No single variable has been found to predict stewardship behavior because human behavior is complicated by attitude, context, personal capabilities, habit and routine (Stern, 2000), and because of demographic variables, such as economic and education levels (Kollmuss & Agyeman, 2002; Oskamp, Harrington, Edwards, Sherwood, Okuda, & Swanson, 1991), sex and age (Stern, et al., 1993; The Ocean Project, 2009; Tindall, Davies, & Mauboules, 2003; Zelezny, Chua, & Aldrich, 2000), and political orientation (Tarrant & Cordell, 1997).

Nonetheless, some research has indicated that positive experiences with animals can help to establish caring attitudes about nature, in general (Myers & Saunders, 2002; Myers, Saunders, & Birjulin, 2004; Vining, 2003). For example, in two studies (n = 160; n = 100) that looked at the relationship between subjects' implicit feelings of connections with nature and explicit environmental concerns, Shultz and his colleagues (2004) found a moderate positive relationship between biospheric concerns and subjects' feelings of being part of nature, and a negative relationship between implicit connections with nature and egoistic concerns. Mayer

and Frantz (2004) tested a different instrument in two studies (n = 60; n = 102) and concluded that feeling connected to nature is an important predictor of ERB and subjective well-being.

These studies held implications for the present study because I expected the participants to share a positive experience with animals in the human-dolphin interaction activity. I also expected that most, if not all, of the participants would share an interest in and probably experience with animals. These shared attributes led to the community designation of *animal enthusiasts*, an identity that they self-reported during the course of the study. The construct of identity was another relevant topic that led me to examine other bodies of research in order to expand my understanding of how participants' identities might be tied to learning in designed settings.

Research on Identity Related to Conservation and Stewardship Behavior

Studies about identity in relation to the natural world provided insight about factors that might fuel the potential of the human-dolphin interactions to influence stewardship behaviors (Frantz, Mayer, Norton, & Rock, 2005). Clayton (2003) argues than an environmental identity is similar to other collective identities, that it can vary in both definition and importance among individuals, and that a strong environmental identity can be a motivating force that guides behavior. She developed a twenty-four-item Environmental Identity Scale (EID) as one means of examining whether individual differences in environmental identity can predict behavior. She used the EID in a series of three studies (n = 73; n = 80; n = 115) that showed that

environmental identity appeared to be a legitimate component of a person's identity and, as such, was a predictor of individual behavior. Although her research focused primarily on individual identity as a product of individual experiences, in her discussion of the findings she also emphasized that identities "have social significance, promoting certain group affiliations and activities, and discouraging others" (p. 59).

One aspect of social identity theory holds that individuals develop identification with others who share a common group membership, such as participating in activities in similar ways (Brewer, 2001; Gutierrez & Rogoff, 2003). This view of social identity places emphasis on the context of identity. Because "identity is often equated with a subjective sense of belonging--to a community, in a setting, or in an activity related to science" (NRC, 2009, p. 74), zoological facilities offer occasions to experience a transient or partial identity with the world of science. Rounds (2006) argues that designed settings offer powerful opportunities for constructing, maintaining, and adapting one's sense of personal identity. A good example supporting this concept comes from a recent study in a zoo in which Fraser, Clayton, Sickler, and Taylor (2009) found that the shared values toward animals and the natural environment gave docents in a zoo (n = 21) a sense of collective identity that supported conservation activism both within the zoo and externally.

The term *ecological identity*, as defined by Zavestoski (2003), "gives an individual the ability to connect her or his social behavior to its environmental impacts" (p. 298). Zavestoski argues that our pro-environmental actions are usually

not rewarded in meaningful ways by the environment itself (e. g. the individual incremental act of riding one's bicycle to work does not have a detectable affect on climate change); therefore, "we depend upon the responses of social others to validate the actions guided by our ecological identities" (p. 301). He goes further to say that the significance of an ecological identity, "and its potential to result in environmentally sustainable behavior rests in its link to social identities" (p. 301). Identities tend to be strengthened as we interact with others and have those identities affirmed (Burke, 1991; Stets & Burke, 2000).

Wenger's (1998) view of identity as an integral part of learning is fundamental to the CoP theory. He states, "Learning transforms our identities: It transforms our ability to participate in the world by changing all at once who we are, our practices, and our communities (1998, p. 227). Vygotsky's view of development as "a process of transformation of individual functioning as various forms of social practice become internalized by individuals" (Penuel & Wertsch, 1995, p. 84), also supports the concept that the socially-mediated process of learning is central to becoming who we are, although Vygotsky did not specifically address the construct of identity.

While the present study does not attempt to examine all the intricacies of identity theories, three aspects of identity are especially pertinent:

1. The motivations of the participants in the human-dolphin interactions are likely to be driven by internal, situational, identity-related goals.

2. The process of learning involves transformations of identities.

3. The participants shared identity of *animal persons* is what constitutes the

community within the CoP framework. The interactions among the group of

participants with this collective identity will influence the participants'

learning, as will each individual's sense of personal and social identity in

relation to animals, to science learning, and to the co-participants.

Just as the concept of identity is intertwined with learning, so too is the

affective dimension of emotions. Because the anecdotal impressions about human-

dolphin interactions suggested that the experiences often have an emotional impact,

the literature related to emotions further informed this study.

Research on Emotions and Learning

A variety of studies have tried to examine emotions in relation to learning.

Fredrickson's (1998) review shows that in multiple studies "positive emotions serve to

broaden an individual's thought-action repertoire" (p. 300); and other researchers

conclude that affect is an integral part of learning (e. g., Zajonc, 1980). Although

many believe that, "…learning is a profoundly emotional activity as well as a

cognitive one" (Erickson, 2001, p. 37), the relationship between emotion and

cognition is poorly understood (Eshach, 2007; Meredith, Fortner, & Mullins, 1997;

Picard, Papert, Bender, Blumberg, Breazeal, Cavallo, Machover, Resnick, Roy, &

Strohecker, 2004).

From the field of neuroscience, a field that is providing ever-growing

knowledge about the anatomy and physiology of the brain (Edelman, 1998), we know

that emotions can have a powerful effect on receiving and processing information:

> The limbic system is our brain's principal regulator of emotions and plays important roles in processing memory. This may explain why emotion is an important ingredient in many memories. The limbic system is powerful enough to override both rational thought and innate brain stem response patterns. In short we tend to follow our feelings (Sylwester, 1994, p. 63).

Confirming and measuring emotion is problematic. In addition to asking participants in this study about their feelings, I thought that I would be able to discern their emotions from observing them. I would be able to see if they smiled or frowned, for example. Research about facial expressions of emotions date from Charles Darwin (1899), and contemporary researchers grapple with theories, semantics, and methodologies about it, and consider that, "The relation of EEs[13] to emotion (and the nature of emotion) remains unclear" (Russell, Bachorowski, & Fernandez-Dols, 2003, p. 330). While earlier work identified cross-cultural similarities in recognizing expressions of happiness, anger, disgust, sadness, and combined fear/surprise (Ekman & Oster, 1979), Russell and his colleagues claim that synthesized research evidence only supports the idea of "minimal universality" in agreement about what signals a facial expression is sending (2003). Although they question, "Does happiness produce a smile?" (2003, p. 337) they also report that research shows that even "with participants isolated from Western ways, agreement that smiles indicate something positive is high" (2003, p. 333).

However, Russell, Bachorowski, and Fernandez-Dols contend that the

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[13] EE means expressions of emotions.

receiver's[14] interpretive process is complex and affected by multiple factors, including aspects of the sender's identity, the sender's situation, the social context, and the receiver's current affective state. Both visual and auditory stimuli, such as EEs, are known to influence affect in others. For example laughter often elicits laughter and the sound of thunder can elicit anxiety. EEs, therefore, may alter the receiver's affective state, especially when the sender's signals are specifically directed to the receiver.

Researchers in various fields have tried to measure emotion and get at the connection between emotion and learning in a variety of ways. For example, in one study in a zoo, researchers electronically paged each of the 279 adult subjects while they viewed three different animals in their habitat enclosures, signaling them to complete a self-report survey about their feelings at the moment. Results showed that the emotional responses related to a sense of connection and love ranked the gorilla highest, the okapi in the middle, and the snake the lowest. Furthermore, they found there was a relationship variable in that, if the visitor perceived that the animal was paying attention to them or to other people, this influenced the degree to which they experienced various emotions (Myers, Saunders, & Birjulin, 2004).

In a preliminary study in Australia, Smith and his colleagues (Smith, Weiler, & Ham, 2008) strapped ambulatory cardiac monitors to nine subjects to test emotional arousal as they went through eight experiences at a zoo. The two self-report measures of emotions showed that a lion-feeding experience and a birds-of-prey show were the

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[14] Russell, Bachorowski, and Fernandez-Dols report that the study of EEs is separated into two topics: (a) the response of the receiver (this may include attributing an emotion to the sender), and (b) the sender's production of signals. He argues that evidence for one of these topics cannot be assumed to be evidence of the other (Russell, et al., 2003, p. 332).

most emotionally-arousing experiences; and preliminary findings of the psycho-physiological data support the self-reported data. Another study that used concept maps and an attitude inventory scale to look at knowledge and attitudes about sharks in children and adults (n = 238) found there were moderately strong relationships between knowledge structure variables and attitude dimensions (Thompson & Mintzes, 2002).

Another study (n = 281) has demonstrated that emotional affinity, indignation, and interest are powerful predictors of nature-protective behavior, and that 39% of emotional affinity toward nature traces back to personal experiences in nature (Kals, Schumacher, & Montada, 1999). Bogeholz (2006) reports in a research review article that nature experiences have consistently been shown to be important factors related to environmental knowledge, values, and action; and Vining and Ebreo (2002) consider emotion to be a fundamental part of motivation.

Therefore, because emotion appeared to be potentially important as it related to both learning and to feelings and attitudes about animals, nature, and conservation, the research design of this study provided opportunities for the participants to talk and/or to write about their feelings. General impressions from observations were intended to confirm or refute the participants' self-reported feelings.

Research on Intergroup Contact

Although research about intergroup contact has focused on human behavior, with the goals of understanding racial prejudice and improving intergroup relations

(Dovidio, Gaertner, & Kawakami, 2003; Pettigrew & Tropp, 2006), there are several

research findings from this field that may well be applicable to this study of

interspecies contact. For example, (a) simple exposure to a different other helps to

reduce uncertainty (Lee, 2001); (b) empathy can lead people to feel more positive

about another, and empathy influences people's motivations to act in a more

supportive manner for others (Batson, Batson, Todd, Brummett, Shaw, & Aldeguer,

1995; Batson, Polycarpou, Harmon-Jones, Imhoff, Mitchener, Bednar, Klein, &

Highberger, 1997); and, (c) by learning about others, "people are more likely to see

others in individuated and personalized ways" (Dovidio, et al., 2003, p. 10).

Pettigrew's and Tropp's meta-analysis of the intergroup contact theory (2006)

suggests that, "contact theory, devised originally for racial and ethnic encounters, can

be extended to other groups" (p. 766).

 Research about intergroup contact shows that, "affective factors play a critical

role, potentially as mediators, of the effect of contact for reducing bias" (Dovidio, et

al., 2003, p. 10). Furthermore,

> When intergroup contact is favorable, psychological processes that
> restore cognitive balance or reduce dissonance produce more
> favorable attitudes toward members of the other group and towards
> the group as a whole to be consistent with the positive nature of the
> interaction" (Dovidio, et al., 2003, p. 9).

 While intergroup contact research suggests that there are certain conditions,

known as Allport's conditions[15], that are "best conceptualized as an interrelated

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[15] Allport, as reported in Dovidio, Gaertner, and Kawakami (2003, p. 7), identified four prerequisite
features for contact to be successful in reducing intergroup conflict: (a) equal status, (b) cooperation,
(c) common goals, and (d) supportive norms. One area of research that builds on Allport's work done

bundle rather than as independent factors…At the same time, Allport's conditions are not essential for intergroup contact to achieve positive outcomes" (Pettigrew & Tropp, 2006, pp. 751, 766). This statement opened the possibility for some of the same dynamics that are seen in intergroup contact between unfamiliar human groups to also factor into interspecies contact in the present research investigation, particularly since the human participants are likely to value and care about animals, in general.

Chapter Summary

An individual's experience during a visit to a zoological facility is affected by a variety of internal and external factors on the personal, contextual, and social planes, including influences from the broad cultural-historical milieu. The process of making meaning in these contextually-rich settings is multidimensional and complex. The multiple variables related to motivations to engage in stewardship behaviors, and the challenges inherent in conducting research in public spaces also contribute to a resultant complexity of the research.

I reviewed a wide range of literature in order to understand what is known about learning in designed settings and also to understand previous research in other fields that relate to and inform my investigation. These studies include research about the history and regulations concerning marine mammals in public display, interactions with dolphins in the wild, science learning in school settings, education and visitor

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in the 1950s has focused on the mechanisms that mediate attitudinal and behavioral change, with affective factors playing a significant role.

outcomes in designed settings, identity development, conservation and stewardship behavior, emotions, and intergroup contact.

Armed with this knowledge and after having read many examples of different educational research projects conducted in public spaces, I established the research design and methodology that are presented in the next two chapters, starting with descriptions of the participants and research settings.

III. THE PARTICIPANTS AND THE SETTING

This chapter defines and describes the participants, addresses concerns related to my positionality, describes the research settings in detail, and tells about the sequence of activities within the human-dolphin interactions. After the parameters for the investigation have been established in this chapter, Chapter IV describes the research design and methodology.

It is important to note that, in addition to the human participants, the dolphins were also key participants in the interactions. Without the dolphins, the interaction experiences could not have occurred. It was visually apparent that the dolphins had learned many skills that facilitated the interactions, such as remaining motionless in one place (termed *stationing* by the trainers) while people touched them, performing various behaviors on cue, and allowing strangers into their habitats without harming or avoiding them. However, it is beyond the scope of this study to assess the learning outcomes for the dolphins in the interaction sessions.

The Participants

In the situated learning and Community of Practice (CoP) theoretical framework, learning occurs as people participate in shared endeavors with each other, with all participants playing active but often asymmetrical roles in sociocultural activity. This model allows for the diversity of knowledge, interest, motivations, and

goals that exist among the visiting public and the staff at aquariums and zoos and also for different types of participation within a community of animal enthusiasts.

The Participant Categories

Using the framework of a CoP, there are a variety of ways to participate in an activity, from peripherally to centrally. In this study, the terms *participant* refers to three categories of people: *visitors*, *spectators*, and *trainers*. Table 3.1 presents definitions of these various types of participants.

Table 3.1.

Definitions of the Categories of Participants

Visitors	The term *visitor* refers to adult members of the public who went into the water to interact with dolphins under the direction of one or more staff members. Data were collected from visitors who had participated in the interactions within 24 hours of their interview and from other visitors who had participated in the past, from one week to several years earlier.
Spectators	The term *spectator* refers to adult members of the public who watched human-dolphin interactions but did not, themselves, go into the water with the dolphins.
Trainers	The term *trainer* refers to staff members who guided and directed the in-water human-dolphin interactions with visitors.

Other than the dolphins themselves, the trainers were key participants and those most central to the interaction experience. A key design feature of the human-dolphin interaction activity is that the trainers are far more directly involved with both the animals and the visitors than is typical for animal keepers at traditional zoos where the animals are kept separated from visitors. The ways that the trainers interact with the animals affect how the animals interact with unfamiliar visitors (Hosey, 2008), and thus the trainers' actions and attitudes have a direct relationship to the learning outcomes of the other participants in this activity.

The three categories of human participants in this study were all considered to belong to a larger community of animal enthusiasts. The common features of the animal enthusiasts that comprised this community were interest in and past experiences with animals. In the human-dolphin interactions, the spectators were the most peripheral human participants, the visitors occupied a more central position of participation, and the trainers were the most central (see Figure 3.1).

Female to Male Ratio of Participants

The participants in the human-dolphin interactions in this investigation were adults that came from many different states and also from several foreign countries, including Brazil, Italy, and England. Within the sample, there were significantly more females in all categories (see Table 3.2). This finding was anticipated for the visitor category since, prior to initiating the research, I had been told that about 70% of the
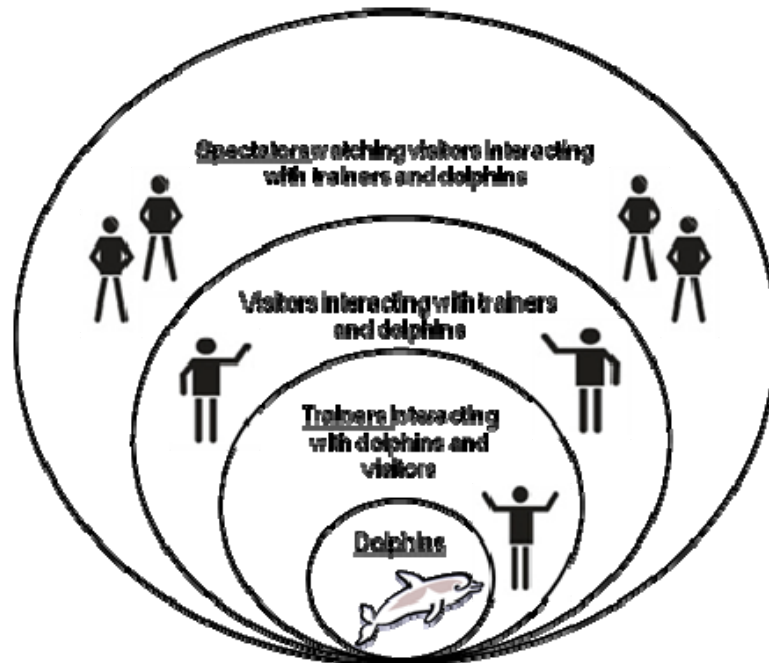
Figure 3.1. There were three categories of human participants within the community of animal enthusiasts in this study about learning through interactions with dolphins.

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visitors were women at Lagoon and Cove sites (Lagoon/Cove Director of Sales and Marketing, personal communication, April 2006) and that Bayside had a similar percentage (Bayside Director of Education, personal communication, April 2006).

There are typically more female dolphin trainers at the Lagoon and Cove sites and more female dolphin trainers within the profession generally (Lagoon/ Cove Director of Marine Animals personal communication, February 2007). The unequal female to male ratio suggests that this study had a fairly representative sample of the population of visitors and trainers in interactions with dolphins in the research sites.

Table 3.2.

Females Comprised the Majority of Participants in Interactions with Dolphins

	Spectators	Visitors	Trainers	Questionnaire Respondents
Females	81%	80%	95%	83%
Males	19%	20%	5%	17%
Total numbers	16	15	20	933

Addressing Concerns Related to My Positionality

My work as a longstanding marine educator led me to select these three particular research sites because of (a) their reputations for excellence and leadership in the zoological community, (b) my geographical proximity to them, and (c) my more than 20-year association with two of the sites. I am currently a paid advisor for the parent company of the two sites called "Lagoon" and "Cove" in this study[16]. My husband and his business partner own these businesses, and I served as corporate head of education for the company's first 15 years, from 1988 to 2003.

I have never been financially affiliated with the third site, called "Bayside" in this study, but through many years of involvement in the marine mammal community, I have established collegial relationships with senior-level personnel in the education and animal departments there. My relationships and my familiarity with the physical,

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[16] The three zoological facilities have been given pseudonyms in this document.

behavioral, and temporal constraints of human-dolphin interactions helped me gain access to these sites for conducting research and I was able to fit this research into normal business operations with minimal disruption. None of the three sites paid me or contributed any funds toward this research study.

Risk of conflicts of interest for the staff members at the Lagoon and Cove sites because of my positional relationship to those companies was reduced because none of the staff members reports to me through a management chain, and I have not been involved in daily operations at the sites since 2003. In my current job, I do not visit the sites regularly, and I did not know the majority of the trainers at the Lagoon or Cove sites prior to collecting data. I did not know any of the trainers at Bayside. As required by UCSD's Human Research Protection Board, I strictly upheld the confidentiality of all subject's names and identity information. Subjects' comments are not linked to their individual names.

To reduce potential perception of special treatment or reduced rigor in this research based on my relationship to the Lagoon and Cove sites, I followed all formal protocols of their corporate research policies, and my husband recused himself from involvement in the research committee in relation to all aspects of the project, including the proposal. For the project, (a) I submitted a short form and a full proposal to the research committee and answered the committee's questions by phone conference call before approval was granted; (b) the corporate acting-director of research acted as the liaison between my project and the company; and (c) each site's manager became my primary on-site contact.

At Bayside, I also followed all of the formal corporate procedures and protocols required of all research projects: (a) I submitted a short form and a full proposal to the research committee; once the project was approved, (b) I was assigned a director-level primary contact on site; and (c) I checked in and out each day with the supervisor of dolphin interaction programs. In addition, the three sites have research reporting requirements with which I have complied.

Another potential or perceived risk of bias might arise in relation to my reporting of the findings because of my positive disposition toward these facilities. I believe that responsible zoological facilities, such as Lagoon, Cove, and Bayside, serve as important community resources where people can see, begin to learn about, and appreciate the diversity of animals on our planet. These facilities also promote awareness of some of the conservation issues related to the animals, and give concrete suggestions for stewardship behaviors that individuals can do, a service that many people in the United States have indicated they need (The Ocean Project, 2009). Although some critics contend that education at certain zoological facilities is superficial and mostly marketing hype (Davis, 1997), my experience with many of the professional educators and animal personnel who work at marine mammals facilities has given me enormous respect for their dedication, expertise, and commitment to sharing their love for and knowledge of animals with others.

To address the issue of possible bias, I took the following measures in my research design: (a) the interview and questionnaire questions were written as open-ended, neutral queries (see Appendices A, B, C, and D); (b) data can be tracked to

their sources; (c) every interviewee was given the opportunity to review and confirm that I was accurately capturing her or his meanings; (d) I reviewed my observations at each site with staff members to get their corroboration; (e) I triangulated the findings through multiple data sources; and (f) I have provided extensive and detailed evidence in the interpretation of the findings, as reported in the findings chapters.

The Settings

Many people learn about dolphins through watching television shows and movies, and through reading. If they wish to see dolphins in person, people can visit a coastal locale and/or go on a boat excursion, generally for a fee, in the hopes of viewing dolphins in the ocean. To be assured of seeing dolphins, people can visit a zoological facility that has dolphins in its collection, most of which charge an entrance fee. In order to legally touch and get into the water with dolphins in the United States, people must find a facility that offers dolphin encounters and pay a fee. There are twenty-two zoological facilities in the United States that offer such activities, referred to as *human-dolphin interactions*, *programs*, or *encounters*.

Public display of dolphins in zoological facilities is a highly specialized, complex, expensive, and heavily federally regulated endeavor in the United States. In collaboration with the significant contributions of the U.S. Navy Marine Mammal Program (Department of the Navy USA, 2008), much of what is known about dolphin physiology, reproduction, and behavior has been learned in these facilities with the staff specialists at the three research sites figuring prominently among the leaders in

the field. Research in these facilities not only benefits the care and maintenance of the animals in residence, but also it often has applications to animals in the wild, such as studies of hearing thresholds of marine mammals done at Bayside (Southall, Bowles, Ellison, Finneran, Gentry, Greene, Kastak, Ketten, Miller, Nachtigall, Richardson, Thomas, & Tyack, 2009), and studies of heat loss in fast-swimming dolphins done at Cove (Pabst, McLellan, Meagher, & Westgate, 2002).

Three Research Sites

This research was conducted at three facilities in the United States that offer interaction experiences with dolphins to the general public. The three sites are referred to in this study as Lagoon, Cove, and Bayside. All three sites are accredited by the Alliance of Marine Mammal Parks and Aquariums and Bayside is also accredited by the Association of Zoos and Aquariums. The three marine zoological facilities are active participants within the professional fields of marine education, marine animal training and husbandry, and marine mammal veterinary medicine.

The Lagoon and Cove sites are sister facilities under the same parent company. Both are located within hotel resort properties on different islands within the State of Hawaii. Dolphin interactive experiences are the primary business activities of Lagoon and Cove sites. There is no admission charge to enter the resort properties where these sites are located, and anyone may watch the dolphins free of charge at any time of the day or night. Both Lagoon and Cove offer a selection of in-water dolphin interaction experiences that vary by theme and auxiliary activities, such as guided snorkeling or

kayaking. At the time of this research project, prices varied from $199 to $350 per person depending upon the activities and program lengths.

Lagoon site opened in 1988 and was one of the first four zoological facilities in the world to offer interactions with dolphins. Because dolphin encounters were new activities in public display facilities, Lagoon and the three other facilities were rigorously monitored in the late 1980s and early 1990s by the National Marine Fisheries Service (NMFS), a federal agency under the United States Department of Commerce, and they were also the focus of a comprehensive NMFS research study in 1992 and 1993 (Samuels & Spradlin, 1995). These studies determined that controlled dolphin interactions with the public were safe activities for both humans and participating dolphins. They, as well as any activity that involves marine mammals in the U.S., continue to be regulated and monitored by NMFS and the Animal and Plant Health Inspection Service (APHIS), another federal agency under the United States Department of Agriculture (USDA).

Cove site opened in 1999 under the ownership of the same parent company of Lagoon site. Prior to 1999, the hotel had a few dolphins in its lagoon under the management of a nearby marine park that limited its activities to daily feeding sessions and occasional casual behavior demonstrations. Under its current owners and management, Cove is a well-maintained facility that operates with high professional standards. In addition to its interaction activities with marine animals for the public, Cove is a very active site for noninvasive dolphin research.

The Bayside site is substantially different from the island facilities. At Bayside,

the dolphin interactions are one component in a large stand-alone oceanarium located in Southern California. The park has many types of ocean exhibits and an extensive collection of sea animals, including various species of marine mammals. In addition to large stadium shows, aquarium display buildings, restaurants, themed rides, and seasonal troupes of entertainers, Bayside offers interaction opportunities with several species of marine animals, such as penguins, beluga whales, and stingrays, as well as a selection of different types of interactive experiences with dolphins.

Bayside began dolphin interactions in 1996 and has since added interaction activities with other marine mammals at this site and also at its two sister oceanariums, located in two different mainland states. In addition to the cost of admission to the park that was $65 for an adult at the time of this research, there was an additional cost of $170 for the in-water dolphin interaction experience that included an education classroom component.

Physical Differences of the Research Sites

The three sites varied in physical design. Lagoon site was a very large natural rock and sand tidal lagoon fed by the ocean at one end and located on one side of a large resort property. On the north side of the lagoon, there was a large grassy sloped berm between the ocean and the lagoon on which people often sat to watch the dolphins beneath the shade of tropical palm trees. The lagoon had a gently sloping sandy beach along the entire north rim to allow easy entry. West of the lawn area, there was a small village of thatched-roof buildings that included a check-in desk,

restrooms, changing rooms and lockers, a boutique, a productions lab, a classroom, and an activities' center with a large viewing deck area overlooking the lagoon. Heading south, a path led into one prong of the service area, a one-mile long tunnel complex underneath the resort buildings. A path emerged from the service prong on the south-east side of the lagoon that led down to a complex of docks that defined several enclosure areas that were used for separating dolphins throughout the day.

Lagoon site conducted interaction sessions in these enclosures as well as in the large lagoon. The east side of the lagoon connected to a larger lagoon that led directly to the ocean and was populated with many tropical fish and sea turtles that freely swam to and from the ocean. Small and larval stages of endemic sea animals had swum into the dolphin lagoon and taken up permanent residence as adults. A path over a bridge and deck area between the two lagoons led to stairs that went up to an open-air restaurant and back to the grassy knoll. The bridge area and restaurant terrace were other common places for spectators to view the dolphins.

Cove site was a large lagoon constructed of natural-looking sculpted rocks, lying about 75 feet from the ocean, and located in the center of a hotel's property. The lagoon had an irregular shape with a peninsula extending into one side of the largest water area and several smaller pools that were all part of the dolphins' habitat. The interaction check-in desk, a retail cart, and visitors' lockers were located on the peninsula and several dolphin separation quarters surrounded it. Individual hotel rooms with small lanai[17] rimmed two sides of the large lagoon area to the south-east.

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[17] Lanai is the word used in Hawaii to denote a porch or patio.

There were additional small rocky pool habitats for sea turtles, stingrays, and many tropical reef fish adjacent to the dolphin habitat areas. A path with several small bridges and many mature tropical plants bordered two sides of the lagoon. The hotel's swimming pool was situated on the east side of the path. Although there was no single vantage point from which an onlooker could see the dolphins' entire water habitat at Cove site, there were many places along the path and on the bridges where spectators could watch the dolphins. Dolphin interaction sessions were conducted in all areas of the habitat, and access into the water varied from locations with a gently sloping sandy shore to stepping stones.

The Bayside site was a large constructed concrete pool with sculpted rock features. It was located near the center of the marine park about 300 feet from an ocean bay although one could not see the bay from the dolphin interaction area. The dolphin interaction area was designed to have the flavor of a Caribbean island and small buildings that housed the retail shops, the reservations and check-in desks, and the staff offices in the back were peach-colored with aqua-colored trim and either tile or tin roofs. The freeform pool of the dolphin interaction area had four large, flat, underwater ledges upon which the visitors and trainers stood during the interaction sessions. Three of the ledges were about thirty inches deep and the fourth ledge was a bit deeper. From the classroom and locker rooms, visitors approached the interaction pool by walking down a boardwalk ramp and over a wood and flagstone deck. Each ledge area in the pool was also rimmed with a small patch of sand. People entered the water via swimming pool ladders at each ledge.

Behind the interaction pool, there were two large animal pools that abutted the back side of the stage area of a large stadium in which dolphin shows were performed, and that also connected to the show animals' enclosures. One could see the audience sitting in the stadium and hear the music and narration during pre-show and show activities from the interaction pool, but these did not appear to be distracting to visitors engaged in the interactions with dolphins. On the opposite, south side of the interaction pool, there was a long, curved wall that overlooked the interaction area. This viewing location attracted many spectators, especially during the interaction sessions. A wide walkway behind the viewing wall bordered a large and colorful playground that had children's rides, tall structures with suspension bridges, and loud musical shows throughout the day. Once again, these nearby noises did not appear to distract participants in the human-dolphin interaction sessions.

Site Operations

The salt water in all three dolphin interaction sites came from the nearby ocean or bay and was filtered, treated in the case of Bayside, and routinely tested to maintain water purity. All three facilities had refuge areas for the dolphins should the animals have chosen not to participate in any part of an interaction session. Typically, the dolphins had free access to all or most of the areas of their habitats at night and during some periods of the day.

Throughout the year, the water temperatures at Lagoon ranged between 78°F and 81°F, and at Cove they ranged between 77°F and 82°F. This warm water meant

that visitors and trainers could be comfortable wearing only life jackets over their bathing suits. At Bayside, the water temperature was chilly, ranging between 60°F and 64°F, so visitors and trainers wore full-length wetsuits over their bathing suits and neoprene booties. I observed that most of the visitors appeared to greatly enjoy wearing the wetsuits since most of them smiled a lot when they first emerged from the locker rooms and many people jauntily modeled the wetsuits for their companions. Ability to swim was not required of visitors at any of the sites, and the buoyancy provided by the life jackets and wetsuits was also a safety measure.

During the day, the trainers usually worked with just a few of the dolphins at a time so the others were directed into various separation enclosures for unstructured time. The term *work,* in relation to these dolphins, means doing a training session, husbandry or medical procedure, or participating in an interactive session with visitors. The animals' activities and dolphin cohorts were changed frequently throughout the working day to give the animals a variety of stimulating experiences. Most of the dolphins involved in the interactions were born at the sites or in another zoological facility, including a few youngsters that were products of artificial insemination, a cutting-edge technology in marine mammal science.

All training was accomplished using operant conditioning through positive reinforcement techniques such as food, tactile (rub downs and petting), enrichment (e.g., toys, water spray, and ice cubes), and individual attention. Regardless of their activities, the dolphins always got their full ration of food each day, quantities of fish and squid that ranged between two pounds for a young calf that was still nursing and

thirty-five pounds for a large full-grown adult. Each individual dolphin participated in interactions with visitors less than two hours within every 24-hour period at all three sites. It must be stated here that not all facilities that offer human-dolphin interactions adhere to such exemplary standards, beyond, in fact, those required by NMFS and APHIS. Some of the dolphin interaction facilities outside of the United States, in particular, have questionable practices.

Although the human-dolphin interaction sessions sometimes included other activities, such as a classroom presentation or kayaking in the lagoon, this research focused only on the in-water dolphin interaction portions of the sessions which generally lasted between 20 and 30 minutes and typically included visitors ages five and older.

The Human-Dolphin Interaction Sessions

The dolphin interaction sessions at all three sites typically involved one trainer, one dolphin, and a group of one to six visitors together in the water. Frequently, there were one to three similar groups involved in their own in-water interaction experiences at the same time in nearby areas of the dolphins' habitat, and all groups had photographers in or near the water during a portion of the sessions. At Lagoon and Cove, a portion of the sessions occurred in deep water so there was always an additional trainer stationed out of the water as a spotter for participants' safety.

The three sites usually had one or more trainers working with other dolphins in adjacent enclosures who helped to coordinate animal movement in and out of the

interaction areas. The interaction experiences at Bayside involved only shallow-water wading, so the spotter trainer was stationed in the animal holding area to help coordinate animal movements. Throughout the interaction sessions, the trainers had frequent vocal and hand-signal communication with the spotters and the trainers in the holding areas.

At all the sites, the trainers guided the visitors' activities and their contact with the dolphins, and they also directed the dolphins' behaviors during the interaction sessions. It was commonplace for the dolphins to interact with one another and for the trainers to direct the dolphins to switch groups during the sessions. During the interaction experiences, visitors typically did the following activities: (a) touched one or more dolphins on the body below the blowhole, and on the dorsal fin, pectoral flippers, and flukes; (b) fed the dolphins; (c) gave signals that elicited trained behaviors, such as waves, jumps, and splashes; (d) played with various toys with the dolphin, such as balls, and hoops; (e) examined or used dolphin husbandry equipment; (f) posed for photographs with a dolphin; and, in the cases of Lagoon and Cove, (g) swam and floated beside the dolphins in the deep water, and (h) used a snorkel mask to watch them underwater. None of the research sites allowed visitors to hang onto a dolphin's dorsal fin to be towed, although Bayside allowed this activity in another interaction program that involved fewer numbers of people.

While the visitors were in the water, the trainers did not follow scripts. When I asked about the content of the sessions, I was told that the trainers needed to remain flexible to respond to the animals' dispositions and behaviors as well as the visitors'

abilities, understandings, and interests (Manager of Marine Animals at Lagoon, personal communication, August, 2008; Training Supervisor at Bayside, personal communication, October, 2008).

In the interaction sessions, the trainers typically did the following: (a) guided how, where, and when to touch the dolphin; (b) pointed out various parts of the dolphin's anatomy; (c) talked with their groups about a range of topics, such as dolphin biology, natural history, reproduction, behavior, training, animal husbandry, individual characteristics and histories of the specific dolphins being met, marine mammal research, and conservation issues related to dolphins; (d) directed the visitors to do specific hand and body motions that signaled the dolphins to do particular behaviors; (e) set up poses for picture taking; (f) introduced various toys or props; (g) managed the dolphin's behavior and stayed cognizant of its individual inclinations; (h) communicated with other staff members about the potentially-shifting social dynamics among the dolphins; and (i) maintained vigilance for visitor and animal safety.

It was common for passersby to stop and watch the dolphins swimming in their habitats at all three sites. When humans were interacting with the animals, such as when the trainers did a husbandry procedure or training session, or members of the public engaged in an interaction session, the number of spectators increased. While some people watched only for a short time, a number of people typically watched the entire event. If site personnel were available in the public area to interpret the activities, such as explaining a husbandry or veterinary procedure, typically a small crowd would gather, listen attentively, and ask many questions.

Chapter Summary

There were three types of participants in the human-dolphin interactions in this study: (a) visitors were members of the public who entered the water to directly interact with the dolphins and trainers, (b) spectators watched the interaction activity from a peripheral position and did not enter the water themselves, and (c) trainers were employees of the research sites who guided the visitors and dolphins in the water, and were the most central human participants. There were more females than males in all categories of participants.

Because of my personal and professional relationships with the three research sites, I enacted a number of measures to address concerns of potential conflicts of interest, potential special treatment or reduced rigor, and possible bias.

The research settings were three zoological facilities in the United States that offer human-dolphin interactions to visitors. Two of the research sites, Lagoon and Cove (the sites have been given pseudonyms in this document) are owned by the same parent company and are operated as stand-alone interaction sites located within resort properties. The third site, Bayside, is one component of a large-scale oceanarium. Lagoon was one of the original sites to offer Swim-with-the-Dolphin (SWTD) experiences for the public. These activities are federally regulated and have been determined to be safe for the animals and the public (Samuels & Spradlin, 1995).

Although the interaction sessions were unscripted, visitors engaged in similar activities in all the sessions. These included touching and feeding the dolphins,

playing with them and giving behavioral cues, listening to the trainers explain about

husbandry behaviors and research, posing for pictures, and, in the cases of Lagoon and

Cove sites, going into deep water to watch and swim with the dolphins. These

activities typically attracted a large number of spectators who were focused

      Having described the participants, settings, and activities of the human-

interactions at the three research sites in this chapter, the next chapter presents the rest

of the elements of the research design and methodology used in the investigation.

IV. RESEARCH DESIGN AND METHODOLOGY

This chapter presents the research design and methodological approaches used to investigate what participants learned through interacting with dolphins in zoological facilities. It begins with the research paradigm and assumptions, defines some potentially-confusing terms, gives an overview of the research design, and identifies the unit of analysis. Next, it explains the rationale and procedures for selecting the sample and provides details of the data-collection processes. Finally, it outlines the data-reduction procedures, and describes the strategies for data-analysis that led to the findings that are reported in the following three chapters.

Research Paradigm and Assumptions

I approached this research from a constructivist paradigm and its basic assumptions: (a) there will be multiple social constructions of meaning, rather than one objective reality; (b) the data, interpretations, and outcomes are rooted in the context and the persons involved; and (c) new concepts and themes will emerge in an evolving nature during the course of this research (Guba & Lincoln, 1982).

One of the methodological implications of the constructivist paradigm is that there may be potentially-confusing terms. Because many of the terms used in this study can have multiple meanings, Table 4.1 defines several key terms.

Table 4.1.

Definitions of Key Terms

meaning making	Meaning making refers to a holistic and active process of constructing personal understanding. It encompasses emotional responses, attitudes, and knowledge gain, as in recalling factual information.
interactions with dolphins	Interactions with dolphins means voluntary shared exchange of activities between a human and a dolphin, such as approaching and looking at one another, feeding and touching (the person), accepting food and being touched (the dolphin) and swimming near one another. These activities are controlled and supervised by experienced animal trainers in zoological facilities.
zoological facilities	Zoological facilities are aquariums, zoos, marine parks, and like public-display institutions that have a collection of living animals, are regulated by United States federal laws, and are open to the public.
pro-environmental, conservation, and stewardship	These terms connote consideration for the sustainability of natural cycles and systems, a desire to live in harmony with the natural world, and the reduction and/or prevention of human-caused damage to natural ecosystems.

Methodology in Designed Learning Environments

Common methodologies in studies in designed learning environments are timing and tracking, self-report surveys and questionnaires, observation, face-to-face interviews, follow-up phone interviews, and focus groups. Newer methods include the

personal meaning map (PMM) developed by Falk et al. (Falk, Moussouri, & Coulson, 1998), photograph analysis (DeMarie, 2001), Web surveys (Yalowitz, 2004), and conversation analysis (Ash, 2003; Borun, et al., 1996; Clayton, Fraser, & Saunders, 2008; Leinhardt & Crowley, 1998; Leinhardt, Crowley, & Knutson, 2002; Roth, McGinn, Woszczyna, & Boutonne, 1999; Valle & Callanan, 2006).

Although some authors have advocated that knowledge-based assessment is the best evidence of learning (Spotte & Clark, 2004), many researchers utilize multiple methods of data collection and analysis to try to tease apart the complex, intertwining aspects of visitors' experiences. For example, one museum investigation (n = 217) used pre/post interviews, personal meaning mapping, multiple-choice questions, self-report items, and tracking to study visitor experiences and concluded that because numerous factors affected learning, no single factor was capable of adequately explaining visitor learning outcomes across all visitors (Falk & Storksdieck, 2005).

Because of the complexities inherent in research in designed settings, I decided to use mixed methods in the present study of learning.

Research Design

This research investigation used ethnographic methods that included cross-sectional and mixed approaches of data-collection (Johnson & Onwuegbuzie, 2004; Tashakkori & Teddlie, 1998). The unit of analysis was each participant's recollections and sense-making of her or his entire experience in the water with the dolphins, in the

cases of the visitors and trainers, or, in the case of the spectators, their impressions and perceptions from watching other people interacting in the water with dolphins.

At the three sites described in the preceding chapter, I collected data from participants who had completed or just watched a dolphin interaction and from people who participated in the past using the following three methods:

1. Interviews (See Appendices A, B, and C for the interview questions.)

   I conducted semi-structured, video-elicited interviews of visitors and trainers shortly after their interactions with the dolphins; and semi-structured interviews of spectators immediately after they watched an interaction session. I video-recorded portions of the visitors' interaction sessions and then showed them these recordings during the interviews to elicit their thoughts and feelings about the activities. I showed the same video segments to the trainers who had led those visitors' interaction sessions.

2. Questionnaire (See Appendix D for the questionnaire questions.)

   I designed an online questionnaire and gathered responses via the Internet. Online surveys or questionnaires, which are a relatively new data-collection tool for visitor studies in aquariums and zoos (Parsons, 2007), have a number of limitations: (a) they selectively exclude everyone who does not provide an email address, (b) they hold risks of multiple submissions by the same individual, and (c) they offer a platform for exaggerated or understated

responses. In the anonymous environment of the Web, "…nefarious behaviors can undermine the integrity of the research data" (Parsons, 2007, p. 17). Despite these drawbacks, this investigation gave me an opportunity to access the large databases of visitor email addresses at the three sites. Since the anonymity of respondents to an online survey may actually generate more honest answers (Comley, 2002), I expected that data gathered in this manner would be useful for comparing to interview data. It was an inexpensive, fast, and practical method to seek the opinions of past participants who are scattered geographically around the world.

3. Observations

I completed a minimum of five systematic observations of human-dolphin interaction sessions at each of the three research sites. Although I was unable to hear the talk between the trainers and visitors engaged in the interaction in the water because of distances from my locations on the shores, I was able to observe the activities, body movements, and facial expressions of the participants, and the flow of activities in and around the water. From these observations, I was able to ascertain a general sense of what is typical for the human-dolphin interaction sessions. I took detailed field notes of contextual factors, such as the weather, numbers of participants and staff, other activities that occurred in the water, numbers of spectators on the shore, and any relevant or unusual occurrences in the general vicinity.

Sample Selection Procedures

Recruiting Visitors

<u>Visitor Interviewees</u>

Because this research was intended to find out what adult participants learn through interacting with dolphins at zoological facilities, I selected visitor interviewees from those adults who were already enrolled in a dolphin interaction experience, a method known as convenience-selection (Schensul, Schensul, & LeCompte, 1999). After visitors checked in and before they went into the water, I recruited interviewees in two ways about equally: (a) I approached them myself, briefly explained my project, and asked if they would be willing to be interviewed after the program; or (b) one of the dolphin trainers introduced me to the whole group so I could give a brief explanation of my research and ask for volunteers. Once a visitor had agreed to be interviewed, I asked her or him to read and complete the consent forms. When the staff determined which visitors would be grouped together in the water, I asked the people who would be in the interviewee's group to read and sign the consent forms for ancillary people whose faces or voices might be captured in the videotape inadvertently.

There were some variations in the sampling procedure at each site:

1. Lagoon site offers professional videotapes of the interactions for sale and recommended that I use their videotapes for my video-elicited interviews. Therefore, I first approached the visitors who had checked in and were wearing

a white wristband that indicated that they were going to be videotaped. Three

of the five visitors eventually interviewed at this site were in this category.

The other two visitor subjects had not pre-purchased a video of their

interaction but the videographers videotaped their groups just the same. Taking

extra videos is a common practice at Lagoon site so that videotapes are

available if visitors decide after the session that they want to purchase one.

2. There were a number of non-English speaking visitors at Cove site when I was

   there so, after check-in, I approached only visitors that I could hear speaking

   English. Despite this precaution, one Italian-speaking visitor volunteered and

   was interviewed with an interpreter present.

3. At Bayside site, either I approached visitors who had checked in and were

   waiting for a trainer to lead them to the classroom or I asked for volunteers

   during the classroom portion of the program.

Past-Participant Visitor Questionnaire Respondents

A little more than half of the respondents to the online questionnaire came

from a list of previous visitors who had given their email addresses to the Lagoon and

Cove sites for the purpose of receiving a monthly online newsletter with updates about

the dolphins and the facilities' activities. I assumed that such past-participants

generally have a positive opinion toward the facilities. If they did not, I doubt they

would have given their email addresses or requested updates. Also, since newsletter

recipients can unsubscribe at any time, I assumed that the people that were in the

database continued to be favorably inclined.

An invitation to complete a questionnaire about the dolphin interaction

experience was posted on the front page of Lagoon's and Cove's online newsletter at

the beginning of September, October, and November, 2008. In November, 2008, a

similar invitation and, a few days later, a newsletter with a notice about the research

questionnaire were sent to Bayside's annual pass holders, since it is likely that some of

them may have interacted with the dolphins in the past.

Ostensibly, all respondents were adults since the questionnaire specifically

asked respondents to verify that they were over 18 or to provide contact information

for a parent or guardian. In the anonymous environment of the Internet there is no way

to verify information, such as the age of a respondent or that a respondent completed

only one questionnaire (Comley, 2002). However a number of respondents stated they

were under the age of 18 and provided the requested contact information of their

parents or guardians. These responses were omitted from the sample. I attempted to

prevent multiple submissions by stating in the introductory paragraph of the

questionnaire, "For the integrity of the research, please submit only one completed

questionnaire."

Recruiting Spectator Interviewees

I selected spectators to be interviewed by approaching individuals or small

groups of people who were watching all or most of an interaction session, introducing myself, briefly explaining that I was a UCSD doctoral student doing research on the dolphin interactions, and asking if any of them would be willing to let me interview them about their impressions of the interactions.

Recruiting Trainer Interviewees

The trainers were recruited in a different manner. During the first day or two at each site, I gave a short PowerPoint presentation about my research to the dolphin trainers and other interested staff members so they would have a general idea of what I was doing and could give me support with logistics. I repeated this presentation several times at each site in order to accommodate trainers' days off. During the presentations, I explained that all interviews were confidential, that their names would not be associated with any of their comments, and that their employers would not have access to the recordings or transcripts of the interviews.

I distributed consent forms for the trainers to read and complete if they were willing to be interviewed. At all sites, all the trainers agreed to be interviewed and returned the signed consent forms. Because I had these signed consent forms from all the trainers, I was able to interview any trainer who led an interaction group in which a visitor interviewee participated, thus giving me data from two perspectives about the same interaction sessions. As each new visitor interviewee was identified, I requested that a trainer who had not yet been interviewed be assigned to lead the visitor's group so that I could interview at least five different trainers at each site.

Additionally, all photographers and other employees, whose faces or voices might inadvertently have been recorded during my activities also signed consent forms, thereby giving me the greatest possible flexibility for my research.

Addressing the Female to Male Participant Ratio

Knowing that there were likely to be more female visitors and trainers, I tried a number of recruitment strategies to give males greater opportunities to participate in this study. For example, I (a) approached mixed-sex groups of spectators; (b) recruited visitor interviewees from mixed-sex groups of people who had already enrolled in interaction sessions; (c) selected trainer interviewees who had guided the visitor interviewees' sessions; and (d) widely dispersed the online questionnaire invitation to past participants without regard to their sex. Despite these measures, the sample ended up to be predominantly female, similar to the ratios known in the past.

Because the three research sites are located within recreational and/or vacation destinations, it is probably a fair assumption that approximately equal numbers of men and women visit them. Even so, this study not only corroborates that a greater number of females enroll in interactions with dolphins and that more women work as dolphin trainers at the research sites, but also shows that more female spectators were willing to be interviewed and more women were motivated to respond to the questionnaire. Other research has shown differences in attitudes and preferences related to animals based on sex (Kellert & Berry, 1987), and the marked sex-ratio imbalance related to dolphins would be a fruitful topic for additional study.

Data Collection Procedures

I spent about 60 hours at each site collecting data. In addition to doing at least five formal observations of dolphin interaction sessions at each site, during which I took detailed field notes, I also observed many other interaction sessions in the process of recruiting interviewees and video recording the interactions. I collected data at all three sites on weekdays and on weekend days. I collected data at Lagoon in August, 2008, at Cove in August and September, 2008, and at Bayside in October and November, 2008. Table 4.2 shows the types and numbers of data collected at each site.

Table 4.2.

Data-Collection Methods and Participant Numbers for Three Research Sites

Sites	Observations	Numbers of Interviewees in each Participant Category			
		Visitors	Spectators	Trainers	Totals
Lagoon	5	5	5	7	17
Cove	5	5	6	7	18
Bayside	6	5	5	6	16
Totals	16	15	16	20	51

Observations

I began data collection at each facility with observations in order to get a sense of normal operations. I developed an observation data-recording sheet that had the

following ten categories: site, date, time, weather, numbers of visitors, numbers of

staff members, numbers of spectators, in-water activities, unusual occurrences, and

observations. I sat or stood alone and wrote extensive notes about what I observed in

these categories as well as anything else that I saw. Because I saw that spectators came

and went during sessions, I counted how many were watching at the beginning, one to

three times during, and at the end of the interaction sessions.

Interviews of Visitors, Spectators, and Trainers: Procedures Common to All Sites

Visitors who had agreed to be interviewed and had signed consent forms were

video-recorded during their time in the water in the interaction sessions. Following an

interaction session, I viewed the video and extracted four or five segments to show

during the visitors' and trainers' interviews. Trainer interviews occurred both before

and after the interviews of the visitors from the same sessions. Since I did not show

video segments of human-dolphin interactions to the spectators, I was able to

interview them immediately when I recruited them.

I took hand-written notes during every interview. I also audio-recorded every

interview except two, one at Lagoon when the informant couldn't wait for me to

transfer the video or retrieve my audio recorder, and one at Bayside when the recorder

didn't work. The duration of the recorded interviews showed wide variation: (a) visitor

interviews ranged between 15:20 and 31:18 minutes; (b) for spectators, the range was

between 8:16 and 27:46 minutes; and (c) trainer interviews were the longest, ranging

between 27:03 and 46:50 minutes.

Near the end of every interview, I asked the visitors, spectators, and trainers to write a postcard to a friend, family member, or to themselves telling about anything in the dolphin interaction experience that was meaningful or important and that they wanted to remember or share. Three interviewees from foreign countries wrote their postcards in their native languages (Italian, Portuguese, and Luxembourgish). The postcard writing took between three and 15 minutes. At a later time, I copied the text from the postcards, affixed the appropriate postage, and mailed them. At the end of each interview, I gave a Hawaiian-print "smooshie" dolphin (a type of stuffed animal) as a thank-you gift. This gift seemed to be well-received by all of the recipients.

Interview Procedures Specific to the Sites

Although I generally followed the same interview procedures at all research sites, I found that it was necessary to make some adaptations to the process based on operational conditions at each site, as described below.

Lagoon

Following interaction sessions at Lagoon site, the length of time required to transfer and edit the video meant that I had to ask visitors to return later in the day for their interviews. This was problematic on two occasions because, of the seven visitors that agreed to be interviewed, two did not return.

At Lagoon site, I did the video editing and conducted most of the interviews in a small conference room in a back-office area located about 100 feet from the dolphin

habitat within the tunnel service area that was relatively quiet and air-conditioned. I interviewed two of the spectators out on the sloped lawn area next to the lagoon because they wanted their companions (one was a young child) to be able to see them during the interviews.

Cove

At Cove site, I was able to reduce the video transfer and editing time by doing the video-recording myself. I was, therefore, able to conduct visitor interviews shortly following the interaction sessions. Even so, I had one visitor who couldn't wait for the video to transfer into my laptop so I conducted that interview without the video-elicited component. I conducted the interviews in the air-conditioned lower lobby of the hotel near the dolphin habitat that was, for the most part, unoccupied by others.

Bayside

Bayside had a classroom in which the trainers gave an educational presentation at the beginning of each dolphin interaction session that covered basic dolphin anatomy, the principles of training, the correct way to touch a dolphin, and how to get into a wetsuit. I was able to use this air-conditioned space for interviews when I could fit them in between educational presentations. In several cases, I began the interviews sitting on a bench outside and then moved into the classroom when it was vacated or vice-versa. It was easier to view the video segments indoors than in the daylight outdoors but the audio-recording worked fine in either location.

Online Questionnaire

I conducted four pilot studies with various versions of the online questionnaire using SurveyMonkey, a commercial survey service that summarized the responses. The questionnaire in the study, however, was formatted in Perseus Survey Solutions software in order to be compatible with the format of the online newsletter sent by Lagoon and Cove sites. Their technicians formatted the questions and a screensaver thank-you gift, embedded the questionnaire invitation into the online newsletter, checked for response numbers, and exported responses into a MS Excel file.

We noticed a surge of responses to the questionnaire immediately following the three dates when the Lagoon and Cove online newsletters containing the questionnaire invitation and link were sent, the date when Bayside sent an E-Blast announcement of the questionnaire, and again when its online newsletter containing a questionnaire invitation and link was sent about a week later. This increase in response rate is consistent with reports in the literature about getting a better response to online surveys by sending reminder notices (Parsons, 2007).

In this investigation, 933 people who had participated as visitors in the human-dolphin interactions in the past responded to the online questionnaire. It is often difficult, if not impossible, to find people who visited a designed-learning venue in the past in order to collect data from them about their past experience. In part because of this challenge, the literature shows that, "There are but a handful of studies that have investigated long-term impact arising from experience in museum and museum-like

settings, and most consider the longitudinal impact over relatively short time frames—

weeks and months after the visitor experience" (Anderson, et al., 2007, p. 199).

Having access to the research facilities' long-standing email databases was an

extraordinary opportunity that yielded rich data about the long-term impact of the

human-dolphin interaction experiences over longer periods of time than has typically

been reported. In this investigation, 70% of the 933 past-visitors responded to the

online questionnaire had participated in an in-water interaction with dolphins earlier

than 2008, more than eight months in the past[18]. Some claimed to have participated in

the interactions as many as 18 years in the past (see Figure 4.1). Data from visitors

who participated in dolphin interactions longer than three months in the past have not

been reported before. This study, therefore, provides a unique look at a large number

of past-participant visitors' long-term thoughts, feelings, attitudes, and reported

behaviors related to their interaction experience in a zoological facility.

Unfortunately, it is impossible to know the rate of return for the online

questionnaire. Although over 50,000 recipients were sent online newsletters that

contained invitations to take the questionnaire and links to it, I do not know how many

people actually opened their online newsletters or e-mails to see the questionnaire

invitations. Without knowing the actual number of people who became aware of the

opportunity to take the questionnaire, it is impossible to calculate the rate of return.

Despite the lack of this piece of information, 933 is a large number of responses, and

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[18] The online survey was administered in September, October, and November 2008.

the online questionnaire responses contain rich data in the form of abundant and

lengthy written commentaries to the open-ended questions.
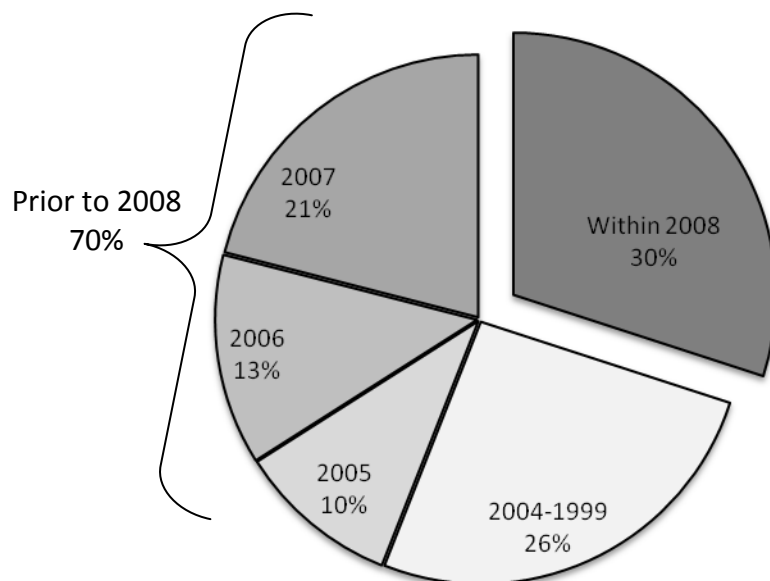
Figure 4.1. Seventy percent of the total questionnaire respondents (n = 933)
participated in dolphin interactions at a zoological facility earlier than 2008, eight
months or more in the past.

Data Reduction Strategies

Observations

The handwritten observation notes were converted to electronic documents that

could be entered into data-analysis software. These notes were reviewed to confirm

various data entries from the interviews and the online questionnaires.

Interviews of Visitors, Spectators, and Trainers

I copied all digital recordings of the interviews into my desktop computer and made back-up copies. I also created various electronic documents for verifying that I had all the properly-signed consent forms, the targeted number of interviewees in each category at each site, and the correct dates and code numbers for all interviews. I also entered the duration of the audio recordings of each interview. A number of interviewees had told me where they reside and so I began adding this information to my hand-written notes about halfway through the data-collection process, and I also entered this information into the electronic files. I did not copy other parts of the handwritten notes that I made during the interviews into electronic files, but these notes were available for reference while listening to the audiotapes of the interviews.

The text from the postcards was also entered into an electronic database. Foreign language text was entered as well as English translations, with the exception of the one postcard written in Luxembourgish. Neither could I find free online translation of this uncommon Germanic language nor did I have any associates who could translate it for me, and I made the decision to not pay a fee to have it translated.

Online Questionnaire

The responses to the online questionnaire were exported from the Perseus Survey Solutions software into an Excel spread sheet and sent to me. I cleaned up the database by deleting any respondents who identified themselves as younger than 18,

duplicates, responses from people who said they had not done a dolphin interaction at a zoological facility, and a few test responses from the technicians, removing a total of 136 invalid responses. I gave each of the 933 valid responses an ID number and I standardized the date format in a new column so responses could be sorted by date. Individual text files were created for each open-ended question so the responses could be entered into data-analysis software.

Data Analysis Strategies

Audio Recordings of Interviews

A research assistant and I listened to the audio recordings of the interviews several times, a process I am calling a *pass,* listening for various keywords, concepts, themes, and the tone of certain types of comments. In the assistant's first pass, she noted time markers of the questions and responses, and also for certain key words that I remembered as commonly used. I wanted to verify my impressions and quantify the key words to compare to the questionnaire data.

Concurrently, I used InqScribe software to make a first pass through several recorded interviews, using a top-down approach (Erickson, 2004) to make note of the location of concepts related to my theoretical constructs of participation and transformation in a Community of Practice (CoP) related to dolphins (or to animals, in general), conservation, and five categories of outcomes identified by the Museums, Library and Archives Council (2004)[19] that seemed promising for showing evidence of

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[19] This process occurred before the NSF and NRC resources were available.

learning: (a) understanding and knowledge, (b) feelings and attitudes, (c) enjoyment and inspiration, (d) behavior, and (e) skills. I also listened for and counted the same key words as the assistant had counted to establish interrater reliability.

We made two more passes of the audio recordings using InqScribe software focusing on comments related to conservation and on the five outcome categories. Passages were coded and transcribed; in some cases, we counted word frequencies.

During the first three passes through the audio-recorded interview data, I began to see comments that did not fit into the expected categories. There were many comments about the behaviors and personalities of individual dolphins and also comments that centered on different kinds of connections to the dolphins. For the fourth pass through the audio-recordings, again using InqScribe software, I took a bottom-up approach (Sipe & Ghiso, 2004) and listened specifically for references to the individuality of the dolphins and to the types of connections or relationships that respondents in the various categories talked about. I listened for details in their speech and also to the tone of their comments.

The assistant and I had transcribed selected passages from all the passes through the recordings, but I found this fragmented text record to be inadequate. Subsequently, I hired a professional transcriber to transcribe all 49 recorded interviews. I reviewed each of the transcripts for errors in transcription of specific vocabulary[20] and entered them into QSR NVivo 8 software for coding into categories.

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[20] There were a few errors in the transcriptions in vocabulary related to animals. For example, I found the phrase "catching monkeys" for capuchin monkeys, "piercing" for purse-seine, and my favorite error, the dolphins' "soulful" groups instead of social groups.

Over the months that we worked with the data, the NSF Framework (Friedman, 2008) and the NRC's Framework (NRC, 2009) were published. These two resources inspired me to rethink my coding and categorization schemes. The final coding scheme is shown in Appendix E.

Online Questionnaire

Using MS Excel software, descriptive statistics were used to analyze the few closed-ended questions and some of the open-ended questions with quantifiable data, such as the location of the respondents' dolphin interaction (Lagoon and Cove and their affiliated sites, Bayside and its affiliated sites, and other facilities). The text from open-ended questions was analyzed for word frequency distributions in order to compare past visitors' responses on the questionnaire to the responses from the other categories of participants.

In addition, I entered the text files of the answers for selected questions from the questionnaire into QSR NVivo 8 software and coded them using the same coding scheme as I used for the interview transcripts. These questionnaire and interview analyses were done concurrently and I found that my increasing familiarity with each body of data informed the other.

Methodological Limitations of the Study

Small Sample Size

Fifteen visitors were interviewed in this investigation. However, in the United

States, I estimate that more than a million people have participated in the in-water

human-dolphin interactions over the past 20 years in the zoological facilities that offer

these activities (now 22 in the United States). The 15 visitors interviewed for this

study are a mere drop in the bucket.

The visitors' voices, however, were also represented by the 933 questionnaire

respondents in this study, a larger sample than has been previously reported in

research on education related to marine mammals. In addition, the open-ended

questions on the questionnaire in this study prompted a large number of lengthy and

detailed narrative responses.

Although the numbers of interviews of spectators (n = 16) and trainers (n = 20)

were also relatively small, these data, I believe, represent the first attempt to

investigate their learning as different-level participants in the human-dolphin

interactions. Despite the small number of subjects, this study provides baseline data

about adult learning through different types of participation in human-dolphin

interactions in zoological facilities.

Potential Weakness of Self-Reported Data

The interviewees and questionnaire respondents in this study told or wrote

about their personal knowledge, opinions, feelings, attitudes, and the stewardship

activities they do. While it is possible that some of them embellished their comments

to sound more socially desirable than would bear out in reality (King & Bruner, 2000),

it was beyond the scope of this research to confirm the veracity of their statements. My

field notes documented multiple observations of the interaction sessions, and I used them to confirm participants' statements, when possible.

Although questionnaire respondents may have distorted their remarks, "…self-reported long-term memory ought to be considered the visitors' current reality of the recalled event, which may or may not be entirely representative of the original reality" (Anderson, et al., 2007, pp. 204 - 205). Memories are constructed realities rather than exact reproductions of events (Edelman, 1998; Falk, 2009; Tuch, 1999) and may, therefore, reflect the meanings associated with the event. These constructed narratives may reflect a *usable past*, defined as "acceptable sources of cultural authority and communal coherence" (Chanady, 1998, p. 1017) and reflect "popular language, mass culture, and stereotypes in their representation of community and construction of communal values" (Chanady, 1998, p. 1018). In their responses, people may have included ideas they had discussed with others or about which they had heard in the media. It is also possible that the questionnaire respondents were individuals who wanted to share their remembrances of their interactions in a kind of social exchange (Dillman, 2007) within the community of like-minded animal enthusiasts. Because I had no way of knowing their motivations, I simply accepted their responses as valid representations of their perceptions of their interaction experience.

Nature of the Homogeneity of Sample

This study did not attempt to include or represent a balanced sample of ethnicities, socioeconomic levels, or ages of the adult participants. The subjects were

selected from the adults who were at the facilities when I was there and included one woman celebrating her 18th birthday as well as senior citizens who talked about their grandchildren. Because there is considerable cost involved in doing the in-water interaction at zoological facilities, it is probably fair to assume that most visitors have a medium to high income level. However, at least five visitors told me that their interactions were given as gifts to them so they had not personally paid anything. The costs of the human-dolphin interaction activities are undoubtedly out-of-reach for people who do not have discretionary money to spend on recreational activities and so they would probably not think of it as a choice.

All three research sites are open to the public and, at Lagoon and Cove sites, anyone from the public may go to the edge of the lagoons to watch the dolphin without any cost. At least four of the spectator interviewees at those sites told me that they were not staying at the hotel resorts where the dolphin lagoons were located so, aside from a possible parking fee, they could watch without any costs. At Bayside, the dolphin interaction area was located within an oceanarium theme park that had an admission price. Once again, however, it is possible that the entrance fee was a gift and thus they may not have incurred any personal cost related to the dolphin interactions.

While the sample in this research is not a representative sample of the population of the United States, it is representative of the people who do these activities in zoological facilities.

Chapter Summary

This research involved complicated logistics and the collaboration and support of many staff members at three commercial businesses. Decisions about data-collection methodology were influenced by the need to conduct the investigation as unobtrusively as possible without interrupting normal business operations. The methods were also dependent upon a favorable reception and cooperation from members of the public during their leisure time.

I took a cross-sectional approach and used mixed methods of data collection that included semi-structured interviews of visitors, spectators, and trainers (n = 51), 16 systematic observations, and an online questionnaire (n = 933). Interviews and questionnaires were comprised of open-ended questions; and, during the interviews of the visitors and trainers, I showed video recordings of segments of the interaction sessions to elicit their thoughts and feelings about the activities.

The large body of data that I collected in this study gave me opportunities to try out a variety of data-reduction and analytic techniques in order to hone in on important features, themes, and relationships in the data. The MLA (2004/Revised 2009), NRC (2009) and the NSF (Friedman, 2008) documents provided valuable guidance in these processes.

Most participants in the interview and on the online questionnaire spoke or wrote about their feelings, interests, and attitudes about the experience in their opening statements. The next chapter discusses the affective dimension that was prevalent in this investigation.

V. THE AFFECTIVE DIMENSION OF LEARNING

There was a strong affective dimension to all three types of participants'

experiences in the human-dolphin interactions. The affective aspects in this study were

evident in their motivations, interest, engagement, feelings, and attitudes.

Impacts in these affective areas are considered to be important outcomes of

informal science learning experiences by both the NSF and the NRC. In the NSF

Framework for Evaluating Impacts of Informal Science Education Projects

(Friedman, 2008), two of the five impact categories for informal science education

experiences are (a) engagement or interest, and (b) attitude. Similarly, the NRC's

framework for learning science in informal environments (2009, p. 4) states, "Two

strands, 1 and 6, are particularly relevant to informal learning environments." The

referenced passages are quoted here:

> Learners in informal environments:
>
> Strand 1: Experience excitement, interest, and motivation to learn
> about phenomena in the natural and physical world; and
>
> Strand 6; Think about themselves as science learners and develop an
> identity as someone who knows about, uses, and sometimes
> contributes to science.

The visitors', spectators', and trainers' motivations, interest, engagement,

feelings, and attitudes influenced their learning. Attitudes are discussed in the

following three chapters in relation to the acquisition of new knowledge and changes

in the participants' sense of agency. This chapter presents evidence of the participants'

motivations to get involved in or watch the human-dolphin interactions, their interest and engagement in the activity, and their attitudes and feelings about their experience.

Motivations for Participating

The research settings were located in recreation or vacation destinations, and thus it is not surprising that the visitors and spectators rarely stated or listed education or learning as a reason for engaging in or watching a human-dolphin interaction[21]. This finding is consistent with the literature about people's motivations to visit designed settings (Falk, 2009; Falk, et al., 2008; Morgan & Hodgkinson, 1999). Because the trainers were involved in the interactions as employees of the facilities, they were not asked why they had participated (see Appendix C for the Trainer Interview Questions).

Visitors' Motivations

Visitors gave a variety of other reasons for doing the interactions, such as, "I've always wanted to do this," "My friend wanted to swim with dolphins," "I love dolphins," and "My wife had done it and she said you HAVE to do this!"

The one visitor interviewee who mentioned learning as a motivation said, "It was an amazing opportunity to get to be up close to them and learn more about them and interact." Some past visitors also indicated that learning was a reason for

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[21] Only one interviewee (a visitor) and 22 (2%) past visitors stated education or learning as a motivation for participating in the human-dolphin interaction activity.

participating in the interaction activity. Examples include: (a) "A love of dolphins and a desire to know more about them. Also I hope to become a vet so anything I can learn will benefit me" (2000 visitor); (b) "They are one of my favorite[22] animals and I wanted to learn more about them" (2004 visitor); (c) "I love animals and love any chance to learn about and interact with them" (2006 visitor); and (d) "Learning from the dolphins and trainer and sharing the experience with family" (2007 visitor).

Although most visitors did not state that learning was their reason for doing the interaction, almost all of them reported that not only had they learned new information but also their interest, feelings, attitudes, and intentions changed as a result of their human-dolphin interaction experience.

Spectators' Motivations

When I asked the spectators why they had watched the interaction session, half of the interviewees said they watched because they knew someone doing the interaction. The others gave reasons for watching that included, "I just happened upon it," "Love of animals," "General interest and time to spare," and "It's such a lovely thing to do. You feel so close to a part of the bigness of nature."

The interaction activity got the attention of passerbys. Although a few passerbys sometimes paused to watch the dolphins swimming or playing among

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[22] Stephen R. Kellert has done seminal research on attitudes toward animals. He and his colleague found that women tend to prefer "domestic animals (e.g., cat, dog) and attractive creatures (e.g., swan, ladybug, butterfly, [and] robin). On the other hand, men were far more likely to award a positive rating to predatory animals (e.g., wolf, snake), invertebrates (e.g., beetle, spider), or game animals (e.g., trout, moose)" (Kellert & Berry, 1987, pp. 365-366).

themselves, I observed dozens of people stop and watch when humans were interacting with them, especially during the public interaction sessions versus the trainers' working sessions. My field notes documented that this happened every day and that most spectators, "watched with keen focus, smiled, and laughed…" They typically didn't converse with others while they watched although some made appreciative comments, such as "Wow!" and "Look at that." Adults frequently held or crouched beside small children in strollers and talked and pointed to the interactions, presumably to encourage them to watch also.

I did not observe this kind of engagement when viewers watched the dolphins swimming alone, and I saw very few passerbys watching the human-only activities in the nearby swimming pools. These observations suggest that it is the inter-species interactions between ordinary (non-professional animal handlers) humans and dolphins that is captivating to watch and memorable to experience.

Interest and Engagement

Visitors' Interest and Engagement

All the visitors expressed high interest and demonstrated engagement in the human-dolphin interactions. Being immersed in the water with large, unfamiliar animals commanded their full and focused attention. They were engaged physically, mentally, and emotionally. Many visitors commented about their intense engagement, such as this statement from a visitor from longer than a year ago:

> [The interaction] was breathtaking, an experience like no other; a
> spiritual feeling peaceful amazing; words can't explain how I felt

when I swam with the dolphins. Unless you experience it for yourself, you will never know just how amazing it is.

A visitor in 2006 wrote, "I felt very connected with the world, like I was part of something much bigger and very important. It made me feel like I was very much in sync with the dolphin."

The social aspects of the socially-situated activity contributed to many of the visitors' interest and engagement. Half of the visitor interviewees participated with family members or friends. Their comments related to the social context of doing an interaction with family members or friends emphasized enjoyment, sharing, facilitating the enjoyment or learning of others, and the ability to talk about the experience together afterwards.

Being accompanied by known companions also provided a sense of security for some visitors. For example, one visitor said that she and her friend, "gave one another support…I liked being with my friend." A woman who participated in 2005 said, "[My daughters] might not have gone if I hadn't also been in the water."

About 10% of the visitors commented that watching the interaction between the dolphins and a family member augmented their experience. For example, a 2006 visitor said, "Having my wife and two daughters along (in our own little group) made it even more special." A woman visitor interviewee commented, "I think you get a lot out of watching other people. I like to see how my kids reacted to the dolphins." A visitor from 2003 wrote, "[I] enjoyed the group experience as my husband and son were with me. Watching other people's reaction was an integral part of the whole experience." A visitor from 2005 reported, "I had been a dolphin geek since high

school so I was familiar with a lot of the information. But watching them interact with

my four-year-old daughter was amazing."

Still other visitors commented about the benefit of being able to talk about the

experience later, such as a visitor from 2007 who said that doing the interaction alone

would have been "not as powerful. I went with my three boys and husband. Seeing the

smile on my children interacting with a beautiful dolphin is priceless. We all share that

memory together forever and discuss it together."

A visitor from 2006 emphasized her appreciation of being able to share her

feelings with her family both during and after the interaction experience. She wrote:

> I did very much enjoy having our small family group (husband, me
> and teen daughter) getting to touch and interact with the dolphin as a
> subset of the small group we were with. It was nice to be able to share
> our feelings with each other during and after the interaction. If it was
> just me…it would be difficult to put into words to other people how
> this made me feel. I did enjoy sharing the feelings of the experience
> with my family members who joined me in this interaction.

A few other visitors talked about the benefits of having other co-participants in

their session, even if they were unfamiliar people, as shown in this remark from a

visitor from three years earlier:

> I ended up with two other children around my niece's age. Their
> parents were watching and they felt drawn to me and my niece and
> we had the experience together. I loved having the other kids in our
> group because for me as an adult seeing the innocence of the kids and
> the dolphins enriched my experience.

A few past visitors commented about doing and enjoying the interaction

because of learning benefits for children in their families. One visitor from 2004 said

her reason for doing the interaction was, "For my daughter. She really wanted to do a

dolphin interaction and to learn more about them." Other examples came from (a) a grandmother who participated earlier in 2008, "[The interaction was] a special moment shared with my 5 year old granddaughter. It was awesome and we learned so much about the dolphins. Definitely something neither of us will ever forget;" (b) a mother visitor in 2008, "I'm fascinated by dolphins and wanted to share this love with my daughter so she will grow up to respect the natural world and all the animals that we share our space with;" and (c) a father/grandfather visitor in 2004, "'I included my son and my two sons-in-law to get them to feel the same way I do about sea life. At another time I took my granddaughter so that she could also gain respect for sea life."

A few questionnaire respondents talked about how the interactions fueled their children's interests in careers in marine or animal-related fields, such as this example from a participant earlier in 2008, "One of the kids I was with was a bit frightened of the dolphins when we arrived…but after watching…and then swimming with them, she has now decided she wants to work with them for the rest of her life!" Several past visitors commented about their children's learning, as illustrated by this remark from a woman who had participated earlier in the year, "My children learned so much and enjoyed themselves. It made a lasting impression on them;" and this statement from a 2007 visitor, "My children have a much better understanding of oceanography and the importance of mankind's environmental responsibilities."

The type of motivation and enjoyment that is tied to providing and/or sharing learning experiences with others in one's social group at a designed learning setting has been reported previously by (Falk, 2006, 2009; Falk, et al., 2008). Although this

study's evidence suggests that some of the visitors in this study could be considered to be *facilitators* according to Falk's typology, many of those visitors indicated that they also would have enjoyed doing the interaction alone. For example, a visitor from 2005 wrote, "I was lucky to only have my husband, granddaughter, grandson, and myself for our interaction. But I would be in heaven to do it myself."

Spectators' Interest and Engagement

Some spectators became interested in the human-dolphin interactions by watching the activity, while others watched because they were already independently interested. Seven of the 16 spectators said they watched the interaction because they knew someone participating in the water, a relative in most cases. One spectator said she watched "my boyfriend," and another spectator said," I have friends who have been participating, so I wanted to follow along the experience with them."

One spectator interviewee who did not know anyone involved in the interaction described her level of interest with these words:

> [It was] incredibly entertaining…fascinating. [It's] something I've never seen before so I find it incredibly amazing. You see it on television, you hear about it, but to actually visually see it, it's a warm and fuzzy feeling, it's amazing… all of it was so interesting.

Another spectator, also one who did not know anyone involved in the water, was more specific, "For me, one thing that was very interesting from what I saw today was how happy these animals are and that somehow they enjoy the interaction with the humans." Comments like these, coupled with my observations that the spectators included in the study spent 20 or more minutes focused on watching the interactions

demonstrates their interest. Additionally, my observation notes show that at least half

of the spectators—even those not included in this study--appeared to be taking

photographs during every interaction session, another likely indicator of high interest.

Trainers' Interest and Engagement

Most of the trainers said they liked being involved with an activity that was so

engaging to other people. One said, "It's awesome to see people get excited about

something that they're interested in." Another said, "So it's just cool to have material

that people get so excited about, to learn about."

A few trainers mentioned how the social aspect of the interactions contributed

to their engaging nature for both trainers and visitors. For example, one trainer

explained why she preferred the interactions to doing dolphin shows: "The reason I

really wanted to [do] the interaction[s] was because I'm a very social person and,

unlike a lot of animal people, I like people too."

Another trainer spoke about the benefits of having multiple visitors in

interaction sessions: "People learned a lot from watching the other guests interact...I

think it sort of changes your perspective…it's really neat for them to be able to watch

everybody else's reaction."

Through their experience as participants in the interaction sessions, several of

the trainers mentioned that they found certain parts of the sessions to be more

engaging for them personally. For example, at least five trainers liked the interaction

portion that was conducted in the shallow water. One said, "Honestly, what I love best

about our site is the shallow waters because that's really where we build all that time

with our animals, and that's the best way to showcase [them]." A different trainer said:

> My favorite part is probably in the shallows, so that people can touch
> an animal. I mean that's really my thing. I feel like they are really
> going to relate to an animal with it right in front of them and they can
> touch them, and then all of a sudden this animal becomes, it's not just
> a dolphin, it's [dolphin name].

A few of the trainers extolled the merits of the deep water portion of the

interactions for different reasons. For example, one trainer spoke about the unique

aspect of full immersion:

> The deep portion can be an amazing part because listening to the
> echolocation and seeing the [dolphins] really swimming in a natural
> environment…we get to see their graceful motions. I feel like that can
> be a really, really amazing part because that's really swimming with
> the dolphins and you are in their environment completely.

Another trainer said the deep-water experience allowed visitors to

have an exclusive moment with the dolphins:

> I think the swim-alongs with the animals seem to be a popular and
> interesting part of the program. One, they're swimming with the
> dolphin, sometimes touching the dolphin during that, and they're on
> their own. I don't have to stand there with them. It's just, for example,
> the couple, just the two of them and the dolphin. They're touching
> and they're swimming so it's kind of like their moment.

A third trainer said that interaction in the deep water enabled the visitors to feel

in synchrony with the dolphins:

> I love this portion because, if they feel comfortable with their masks,
> they can kick alongside; they're really close to the animal. The animal
> is truly responding to them. We've conditioned the [dolphins] to stay
> at the pace of our guests so our guests can feel that if they kick a little
> bit faster, our dolphins will speed up. If they slow down [or] they
> stop, the dolphins will be right there. I love to tell our guests about

that. Also, if they're looking at [the dolphin], a lot of times [they] can make that eye contact.

About a third of the trainers talked about how they became engaged in providing customized experiences for the visitors. For example, one trainer said:

I think it really depends on the group. Some people don't want to wear a mask at all and they don't want to go out deep. One, they can't swim or they just are not interested in seeing it. Some people really like to just have that touch and just be really intimate with the [dolphins] and [they like] touching them all the time, and some people really enjoy the kissing and the photos. I think you definitely have to read your guests and see what they like. If you notice that they want to touch all the time, then let them touch. If you notice that they love being out deeper, be out deeper for longer.

Another trainer similarly spoke about how being flexible and able to respond in different ways in their interaction sessions was engaging to her:

[The activities] depend on the guests and the dolphin for me. If I have guests with mobility issues, or guests [that] are not comfortable in the life jackets (they make them float all over the place), it might be easier to do shallow water [activities] where they're standing. Then we can do all kinds of stuff in the shallow water. I like to spread people out so they get individual time with the dolphin…If you have guests that are really good at submerging and really good with the masks, deep water can be a lot of fun because you can do novel stuff down in the deep.

All of these passages serve to illustrate that the trainers talked about a variety of aspects of the interactions that they found to be interesting and engaging.

It is not surprising that the trainers also liked it when visitors followed directions. For example, one said, "They were really great. They were good and followed instructions well, which is nice since you can do a lot more with people who can listen really quickly." Trainers also liked to see expressions of enjoyment, as shown in this comment: "They seemed to enjoy themselves. They had happy faces the

whole time." One trainer related a vignette about the visitors' enjoyment:

> I like to keep it variable. That was a "carwash" where the guests
> would put their hands out and rub the dolphin as it swam underneath
> them. I had them do it twice. Then we moved on to doing hugs where
> the guests would actually put their arms around the dolphin and the
> dolphin would pose for a photo with them. It's always kind of fun
> because the guests kneel down for the first time in 62 degree water
> and they really feel it creeping into their wet suits. Everybody gets a
> little giddy. They get amazed at how perfect the dolphin can look in
> that pose position and they all smile and laugh.

Although the trainers did not really talk about things they disliked in the human

dolphin interactions, one trainer recounted a time that must have been unpleasant:

"[The visitors] were just out of control in the deep water…at one time [a woman]

kicked me in the face."

Emotional Responses

Visitors' Feelings

Almost all the visitors expressed positive feelings about the interaction

experience. Visitor interviewees tended to talk about their feelings in conjunction with

their thoughts about liking the experience. For example, one interviewee said, "I had a

great time, I learned a lot. It was very educationally-based, I felt. The whole thing was

just an incredible experience. I loved it!" Some said they felt "love" towards the

animals, as illustrated by the words that one visitor wrote in her postcard, "I realize I

love these animals more now than before."

Everyone said they were happy after their interaction session and most used

words such as, "great," "incredible," "amazing," "joy," and "wonderful." These

reports are consistent with my observations that almost every visitor's facial expressions looked happy. For some visitors, the happy feelings were quite intense, as reported by a man who participated seven years in the past: "[What comes to mind is] a very strong sense of inner happiness; a strong inner and outward smile that comes from the most basic sense of self."

Almost all the questionnaire respondents used an assortment of emphatic words when writing about their interaction experiences, such as "fabulous," "phenomenal," and "awesome." Overall, 94% of the interviewees and 92% of the questionnaire respondents used effusive complimentary[23] words when talking about the interactions[24].

Expressions of deep feelings were also common. At least three visitors and a couple dozen questionnaire respondents said it was difficult to articulate their feelings. The majority of questionnaire respondents used phrases or sentences to describe their feelings rather than single words, as shown in this comment from a woman visitor in 2003, "I felt very lucky to have participated in the encounter. I have a feeling of being at peace when I think back to it. Feelings of calm and joy come to mind."

The notion of feeling lucky, privileged, or honored to have interacted with the dolphins was mentioned by about 100 of the 933 questionnaire respondents. Here are

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[23] The four most frequently-used complimentary words were "amazing", "best", "wonderful", and "great". Other common favorable words were "awesome", "incredible", "fantastic", and "fabulous."

[24] So many people used the word *amazing* that I started asking interviewees to tell me what that word meant to them. One spectator defined it as, "It's a feeling I think that comes from or it's deeper than just your thoughts. It's a feeling that comes from your heart. I believe that it's like a deep word, it's a deep feeling."

some examples of written comments on this theme from these visitors: (a) "For me there was nothing like it! I felt so lucky and honored to be so close and to be able to touch them" (2005 visitor); (b) "I felt so lucky to be able to have the opportunity to interact with these amazing animals. It was very emotional for me" (2006 visitor); and (c) "[What comes to mind is] how emotional and privileged I was to have the opportunity to get close to these creatures" (2006 visitor).

A visitor earlier in 2008 extended the notion of being lucky to others when she wrote, "Everyone should be lucky enough to experience dolphins up close at least once in their life." Similarly, a visitor from seven years in the past wrote, "It was one of the most amazing and memorable days of my life. I think it should mean this much to everyone that has the honor of meeting these fine creatures face to face."

A few visitors said they were surprised to have such a strong emotional reaction to the experience, as shown in this remark from a woman who was a visitor in 2001, "I underestimated the emotional impact of it." Another woman who was a visitor in 2007 wrote:

> I had perceived that people who raved about dolphin experiences were a bit "emotional" but I realize now that being with the dolphins is as much about the connection with head knowledge and the education of the mind as it is about connections with emotions.

Women were not the only respondents who reported having strong emotions; some men also said they had been surprised by their feelings in the interactions. For instance, a man who participated as a visitor in 2006 wrote that he was surprised by, "How intense my emotional experience was and how vivid the memories are even after a couple of years. I see the photo [of the dolphin] and can really feel her skin and

sense her majestic nature." This same visitor described his interaction experience as, "pure bliss and exhilaration. It was one of the highlights of my whole life." Another man remembered similar feelings from three years earlier (2005): "[I was surprised by] how powerful [the interaction experience] would be, especially emotionally."

About 20% of the questionnaire respondents wrote personal stories about their feelings, such as this visitor from earlier in 2008:

> Any opportunity to interact with animals, we cherish. Our beloved dog of 16 years just passed away in the last 6 months and we are beyond heartbroken and missing him. We feel that these [interaction] experiences are physically and emotionally healing.

About a third of the visitor interviewees spontaneously expressed the desire to repeat the experience another time, such as this enthusiastic comment: "If I could swim with them every day, I surely would." Although interviewees were never asked directly if they would recommend this experience to others, seven of them said they were inspired to do so. One interviewee said, "This is definitely an experience that everyone should do." Another commented, "I'm definitely going to recommend this experience but I wouldn't tell [my friend] before what it would be. It's difficult to describe. You feel so close. [The dolphin] is not so different from a person."

Of the 15 visitor interviewees, only one said she had been nervous beforehand; and one woman said that, although her son was generally afraid of the ocean, he still enjoyed the dolphin encounter. Only 13 of the 933 questionnaire respondents said they had been nervous or afraid before their interaction, and all 13 also said that they overcame those feelings. For example, a visitor from earlier in 2008 said, "At first I was afraid but when I felt the love of the dolphins I felt more comfortable." A visitor

from 2006 said, "[This was] an opportunity of a lifetime. I am normally very afraid of 'big fish.' I don't like to swim in lakes or oceans but I was not afraid of the dolphins once in the water." Thus, the few visitors who reported having initial feelings of fear or nervousness all reported that those feelings were replaced by positive feelings.

Spectators' Feelings

In addition to being focused and engaged watching the human-dolphin interactions, all the spectators in this study reported that watching gave them positive feelings. For example, one spectator wrote in her postcard, "I had a great time watching the dolphins….All the spectators were really enjoying it." Another spectator said she was surprised by "the emotions it brings out from you." One spectator commented, "It brought tears to my eyes."

Ten of the spectators commented about what they thought the participants in the water were feeling, such as, "It looked like [the visitors in the water] were having fun." and "[Doing an interaction] would be an amazing, intimate experience probably somewhat indescribable; you would get a lot of joy, kind of a euphoric feeling." Several of them made statements similar to this one: "I wish I had done it, too."

Two spectators mentioned that people might be afraid of the dolphins and said they thought the interactions would help people "not to be scared," and, "This experience will bring you closer to nature, reduce your anxiety." Another spectator said she would not want to interact with dolphins herself but that she still found watching a family member participating in the water to be "very interesting." She also

said that she was pleased that her five-year old son who was participating in the water "was aware, he understood, and he laughed at the dolphin's interactions. He giggled and [she liked] how happy it made him feel."

When spectators knew a visitor participating in the water, seeing the enjoyment of their family member or friend contributed to their own engagement and feelings of enjoyment. For example, one questionnaire respondent who watched her niece in an interaction in 1999 wrote, "It was just as thrilling for me as I was being able to watch her and be the picture-taker."

The interactions were inherently social activities involving many people and animals; and the actions, feelings, and attitudes of individuals were affected by, and had an effect on, other participants. The following remark from a questionnaire respondent who had interacted with the dolphins earlier in 2008 illustrates this point: "I love learning about and watching the dolphins! It's wonderful to see them playing in the surf at the beach and it's even more fun to watch them interact with people and other dolphins at the aquarium."

Trainers' Feelings

All of the trainers expressed strong positive feelings about their participation in the interactions. One trainer called the interactions, "very emotionally-charged experiences." Almost all the trainers were emotional about the animals, as shown in one trainer's comment:

> This is a dream come true, it's everything I hoped it would be and more. I love training the animals. I love just relating with them. While

watching the show, I was crying just knowing that I'm the one that's in the water with them. I know there are a lot of people that want to do that. I think I'm just so happy all the time being with the animals.

The visitors' emotional reactions affected the trainers, too:

It's such a wonderful opportunity and gift to be able to be a part of people's dreams. I can't think of any other job that would allow you to, every day, see a new reaction to what someone thinks [dolphins] would feel like or how they would sound when they make a noise from the blowhole. I've been around women who would just start crying and then I start crying because it was just, wow, this is so cool to see how everybody is just so amazed by dolphins.

A few trainers gave examples of specific interaction sessions that were

emotional for visitors, trainers, and, in this case, the spectators, too:

When we do a Make-A-Wish[25] [session], we're always bawling because of it. Just crying, everybody is crying…and by just thinking about, it makes me cry, too. And a lot of people around [that are] watching are going, "Oh! It's such a touching program."…It is special and it definitely brings you a smile.

Over half of the trainers said they felt lucky and had learned to be "grateful

[that] I have this job." Several said, "I have the greatest job in the world." One trainer

explained her feelings about participating as a trainer in these words:

Most of the people say, "You have the most amazing job," and it's very rewarding to hear that. I learn how unique it is, all the time, for us to interact with these animals on a daily basis and get to train them. So, if we ever took that for granted, you learn that most people sit behind a desk. They have always wanted to do this interaction. They saved up for a long time just to be with a dolphin for 20 minutes. I've learned that it's just amazing for us to be able to work with them every day.

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[25] Make-A-Wish Foundation is a non-profit organization that provides experiences for patients with life-threatening illnesses. All three research sites donate many dolphin interactions to Make-A-Wish participants and their families each year.

Only one trainer, fairly new on the job, mentioned a negative aspect of participating in the interactions day after day: "Sometimes I get too much of the public. I [need some] 'me time' and…we went to a [community] fair one night after I'd been working all day and I was extremely burned out."

One trainer talked about the intrinsic rewards that she gained from participating in the interactions:

> I feel this job has really taught me to be thankful [for] what I get to do every day and, on another inspirational note, too, [for] the people that I meet. If it's not about inspiring conservation, it's [about] the emotion that comes out of people meeting these animals. It really paints a bigger picture, too, that there are millions of people in this world. Sometimes, I think that you can feel so small in your own world. But meeting different people every day from around the world and hearing them say, "You just made my dream come true," that's really an amazing place to be.

A different trainer talked about the emotional investment she had in her job:

> I feel so lucky to be a part of, not only the dolphin lives, but even the company that I work for. It has opened the door to so much learning and growing up as a person, changing myself; and it's just incredible that [I] get to grow up with dolphins. It's really, really amazing…I think a part of my emotional investment is that I'm also very close with my family. By moving here, I've had to pick to be close to family or to pursue my dreams…the longer I'm here, the more I build this relationship with the [dolphins]…I mean, how do you choose?

Another trainer talked about the conflict that would arise if she were to leave her job: "I love my job; we have a blast. I don't see myself ever leaving because what would I do after this? And I don't know if I can handle leaving the [dolphins]."

Three of the 20 trainers wept with emotion during their interviews. One of them, a trainer for six years, explained her emotional reaction in this way:

> [This interview] is a mind-opener because I feel talking to you is like talking to me, and I didn't know until I started talking how I feel about my job. So that was great and now I know how much I love this job. No, I mean it… [This site] is one of the best in the world, so I mean I'm so proud to be here.

Although one might expect the trainers, especially those who had been on the job for many years, to be jaded after engaging in repeated interaction sessions, it is not what the data show. On the contrary, the most experienced trainers expressed the strongest affective interest and engagement in the human-dolphin interaction activities, and the deepest feelings about the animals and their responsibilities to them.

Chapter Summary

All three categories of participants in this study were highly engaged in the human-dolphin interactions, they expressed strong interest, they were excited, and they experienced extremely positive and often intense emotional responses to them. Not only are these outcomes considered to be important and valuable in designed informal learning environments (Friedman, 2008; NRC, 2009) but also, in a broad sense, "we know that emotion is important in education—it drives attention, which in turn drives learning and memory…[and] emotion is often a more powerful determinant of our behavior than our brains' logical/rational processes" (Sylwester, 1994, p. 60).

The affective dimension was a significant part of the participants' experiences in the human-dolphin interaction activity and it played an important role in their learning. The next three chapters present the evidence of learning.

VI. VISITORS' LEARNING: FINDINGS AND DISCUSSION

This chapter, and also the two that follow, report and discuss the evidence of learning among each category of the participants[26]. The discussions begin in this chapter with the visitors since this group provided broad evidence of learning in this investigation. The chapter first describes the means by which the visitors learned, and then it reports and discusses the findings based on interviews of 15 visitors at the three research sites and questionnaire responses of 933 visitors[27] who interacted with the dolphins and trainers in the past.

There are five principal findings that apply to the visitor category: (a) visitors gained new knowledge in three categories (dolphin physiology and natural history, zoological activities, and conservation information); (b) visitors constructed meanings by connecting the interactions to concepts and experiences outside of the immediate context; (c) visitors shifted their attitudes and gained a sense of personal agency about beginning or increasing stewardship actions; (d) visitors learned dolphin etiquette skills; and (e) visitors had long-lasting and vivid recollections of what they learned during their participation eight months to 18 years in the past.

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[26] The participants included people who entered the water to interact directly with the dolphins and trainers, called *visitors*; people who watched but did not enter the water or interact with the dolphins and trainers, called *spectators*; and the dolphin *trainers*.

[27] Unless otherwise designated, all the quotes in this chapter are from visitor participants, and have been edited only for clarity. Quotes from survey respondents are indicated by the year of their dolphin interaction experience in a zoological facility, if known.

Participation was the main vehicle by which learning occurred for all human participants in this Community of Practice (CoP). However, participants had access to different means of learning, such as by watching, listening, touching, through physical sensations, and through social contact with others, depending upon their role in the CoP. In each of the findings chapters, the various means of learning will be described for each type of participant, starting with the visitor category in this chapter.

The Means by Which Visitors Learned

The visitors' participation was less central than the trainers but more central than the spectators'. Visitors entered the water and were directly involved with the dolphins and the trainers in the interaction activity, thereby affording them access to multiple learning methods. Visitors could (a) watch the animals and the interaction activities from a close and intimate vantage point; (b) listen to the trainer's commentary and the dolphins' sounds; (c) touch the dolphins; (d) feel physical sensations from immersion in the aquatic environment, such as temperature variations and water movement; and (e) interact with their co-participants. They were literally immersed within the dolphins' habitat and a part of the social practice of the activity that involved the animals, the trainers, and groups of visitors who sometimes knew one another.

About a third of the visitor interviewees talked about things they had seen or watched in the interactions, such as being guided to closely observe details of the dolphins' anatomy. For example, while to the casual onlooker most dolphins may look

alike, one visitor interviewee's comments show how she had learned to distinguish

individual animals:

> We're looking at the tail and she's explaining that each tail is unique
> for each like fingerprints on people. And that's how they identify the
> dolphins from one another by the different things they have on their
> tails—the cuts and shapes.

A few questionnaire respondents mentioned that "Learning to observe" was

part of the experience (2008 visitor). Another visitor, also from earlier in 2008 wrote,

"Just being able to observe them in the water is impressive." A third visitor from

earlier in 2003 commented about using observation skills, too, "You could also

observe their interactions with others." A visitor from two years earlier also recounted

that she had learned to recognize individual dolphins: "Every dolphin is uniquely

marked, and everyone can be identified individually if you know 'who' you are

looking at!" By engaging in the process of observing, participants furthered their

observing skills, assuming that practicing a skill leads to its improvement.

A statement from a visitor in 2001 shows how she learned by watching the

animals on their own and also by watching the trainers work with the dolphins: "I

learned how blood samples are taken, how they are trained, got to view underwater the

interactions of the females with their young, how strong they are, and most of all, how

intelligent they are."

For some, the trainers' talk was an important mediator of learning, as

illustrated by a visitor in 2005 who said, "I learned so much from the trainer about

dolphins, how they are trained, and the personal history of the dolphins."

Touching the dolphins had a powerful impact on many visitors. Almost all of

the visitor interviewees and more than a third of the questionnaire respondents made unprompted comments about touching the dolphins, such as this example from a visitor early in 2008, "I've seen dolphins in the wild, but to see and touch them, [and] to interact with them, increased my love for them just that much more!"

In addition to the focus on touching the dolphins, visitors also commented about learning through sensory experiences in the water, as shown in this example from a visitor in 2003, "I can't say that I learned any 'dolphin' facts. It was more an awareness of their speed and strength after being in the pool with them."

In addition to their individual development, each visitor's actions, comments, feelings, and attitudes influenced the learning of others and the very nature of the socially-situated activity. No two interaction sessions were exactly the same since individuals built new relations with other participants and with the subject matter, and redefined their old relations. As they made sense of their experiences, they were constructing new ways of thinking about themselves and of presenting themselves to others, a process that has been called *identity work* (Rounds, 2006).

Interaction with co-participants, especially friends or family members, enhanced enjoyment of the experience, as illustrated by one visitor who said, "Part of the joy for me was watching my daughter have the same experience." The social nature of the experience also enriched the learning. For example, a visitor from 2007 wrote, "The experience was great as we were able to watch the others in our group respond differently [to the dolphins]." A different visitor from 2005 explained, "It was uplifting to watch a new appreciation develop in other participants."

Knowledge

Visitors gained new knowledge through participation in the human-dolphin interactions. Visitors reported that their interaction experience reinforced or expanded their awareness, knowledge, and appreciation of dolphins. For example, a visitor from 2005 wrote, "I am a lot more aware of their power and size. They are, ultimately, wild animals, which is something you don't really realize until you're actually next to them." Others became aware of the dolphins' intelligence, as shown in this statement: "They are breathtakingly intelligent, which I'd been told but wasn't aware of firsthand" (2005 visitor); and many visitors commented about the dolphins' individuality:

> I knew dolphins could be trained, but I wasn't aware of how they had their individual personalities, the way people do. I guess I thought it would be like snorkeling with fish, you just look at them and maybe get close to them. That was so far from the truth! (2008 visitor)

A comment from another visitor from early in 2008 implied that the interaction was an eye-opening experience for her:

> I was surprised at how gentle the dolphins were and how each had a distinct personality. I never expected that. I didn't know a lot about the animals themselves, the life cycle, time for gestation, nursing, etc. I never thought about what their lives were like outside of watching dolphins at a zoo dolphin show or seeing them in the ocean.

Visitors reported learning new knowledge and attaining new understandings in the broad categories of: (a) dolphin physiology and natural history; (b) zoological activities, such as the care and training of dolphins; and (c) conservation information about environmental issues and stewardship actions related to dolphins.

Information about Dolphins

Almost all of the visitors reported learning a variety of factual information about dolphins, such as details about their anatomy, social behavior, communication, reproduction, habitat, and intelligence. Here are some brief examples given by different visitors: (a) "We learned about their families," (b) "[I learned] the length of time they stay under water," and (c) "[The trainer] explained about the fins." Another visitor generalized by saying, "[The trainers] give you good educational information."

Questionnaire respondents frequently wrote long and quite detailed comments about factual dolphin information, as shown in the following response from a visitor who did the interaction earlier in 2008:

> [People can learn] how intelligent they are. How they are very soft and velvety feeling and not at all like a fish (this we knew but had never had such an experience before). How they have hair follicles & we didn't know that. The fact that they have tears. The way their eyes are so similar to a person's. How their skin sheds. How they communicate with sounds from their blowholes and clicking.

In addition to basic information about dolphin anatomy and nutrition, some visitors described how they had learned to identify individual animals. Although many of a dolphin's identifying marks are likely to be visible from afar, other details about their anatomy were only visible to visitors up close. For example, one visitor said, "The trainer was showing us the blowhole, the veins, and talking about how you can tell males from females."

A few visitors reported learning about dolphin reproduction. At two of the sites, the dolphin residents included mother and calf pairs. Although the visitors may

not have realized that it was a unique experience to be in the water with the calves[28], at

least one mentioned it in her interview: "They showed us the baby…they asked us if

we knew where the belly button was…they talked about the one female that is like a

surrogate mother." A comment from a visitor from 2007 showed her awareness of the

uncommon opportunity:

> I was surprised that there was a baby dolphin in there. We weren't
> supposed to touch it, but it kept coming up to us and putting its nose
> on our feet. Adorable! I was also surprised at how utterly patient the
> mom dolphin was with her baby and the humans.

Touching the dolphins was a highlight about which almost all the visitors and

one-third of the questionnaire respondents spoke. Different visitors described this

simple physical act in a variety of ways such as, (a) "It felt like a wetsuit, thick

muscle, hard," (b) "They have really soft skin," and (c) a visitor from 2007 wrote in

the questionnaire, "[The dolphin's skin was] much thicker than I anticipated." One

visitor's comment reflects how watching and touching were integrated: "[The trainer]

was showing us the mouth and the teeth and allowing us to touch the dolphin to see

what they feel like."

Over half of the interviewees and the questionnaire respondents who wrote

about touch not only described the physical feel of the dolphin's skin but also

commented that the act of touching had a deeper meaning. One visitor from 2007

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[28] Many dolphin facilities do not allow people to go into the water when young calves are present
because they worry that the calves could become disturbed or too excited. The research sites in this
study, along with the U.S. Navy Marine Mammal Program, have the highest dolphin calf
survivability rates in the world (Sweeney, Stone, Campbell, Andrews, St. Ledger, Xitco, Jensen, &
Ridgway, 2009, May). By closely monitoring all calves and maintaining stable and safe
environments, the research sites have not experienced problems when allowing certain mother-calf
pairs to be near or involved in the public interaction sessions.

described it as an emotional connection: "[It was] a life-long dream to be near dolphins, just to be near them and touch them…it's a connection of the heart."

Another visitor, whose interaction was earlier in 2008, explained that touching the dolphin made her believe that she communicated with the dolphin:

> I already knew a dolphin's skin would be soft but was not prepared for just how soft it really is thus, whenever the trainer allowed me to [touch], I made sure to softly stroke both dolphins and tell them how wonderful they were and I could tell they enjoyed it. [They] might not have understood what I was saying but I think my feelings toward them were communicated to them through the touch and petting and talking I did with them.

A comment from a visitor who participated in 2000 suggested that she believed that the touch transmitted the humans' benevolent intentions to the dolphins:

> [I was surprised by] how willing the dolphins were to interact with the humans. Naturally they have been trained, but I felt as though the dolphins "understood" the human encounter/touch and [they] were more than willing to accommodate.

Visitors also described learning through the experience of being in the water, such as, "I liked the deep water the best. [It was] not as physically intimate but it was neat to see [the dolphin] so comfortable in its own environment." A few visitors commented on the fact that being in the water with the dolphins gave them a perspective that is not possible under any other type of zoological experience, such as this comment from a visitor from six years earlier (2002):

> Once I was able to swim underwater with the dolphin and it was during this experience that I was able to clearly hear the clicks and whistles of this majestic animal. While I have heard them numerous times on recordings it surprised and amazed me at how much these vocalizations moved me, and that feeling has stayed with me to this day.

One visitor gave a synopsis of the variety of learning experiences involving the water that were included in her session:

> We swam with them. We got to dance with them. We got sprayed by them. We learned about the different parts of their body and what they do. We observed them, I mean we watched them above water and underwater, learned about the different parts of the body and how each dolphin is unique and different.

The combination of hearing information from the trainers while being immersed in the sensory and physical experiences helped visitors be fully focused and remember information. An example of this type of multidimensional learning is evident in the words of one visitor who, while viewing the video of his interaction that showed a dolphin retrieving an object, said the trainer talked about echolocation and then, "This is where you put your head underwater and you can hear the echolocation[29]."

Another type of sensory experience that was memorable to some visitors involved learning how powerful a dolphin can be through feeling the displaced water volume as one swam towards or near the visitors. As one visitor said, "In the deeper water, you can get a sense of the speed and power of the dolphin. I really liked that."

One questionnaire respondent, whose interaction was in 2005, commented about how he had learned about the agility and control of the dolphins this way:

> [I was surprised by] their power even when right next to you. They can come racing toward you, turn and stop on a dime. Or take off with a swish of the tail. You can feel the power underwater and they were inches away, but never touched you.

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[29] Echolocation is a sensory system that allows a dolphin to determine the size, shape, speed, distance, direction, and even some of the internal structure of objects in the water. Dolphins emit a beam of high-pitched, fast-paced clicking sounds from the melon (the fatty, rounded forehead area); these sound waves bounce off objects in the water and return to the dolphin in the form of an echo. The echoes are received through the fat-filled cavities of the lower jaw bone, transmitted through the ear structures, and interpreted by the brain.

In addition to 80% of the visitor interviewees and half of the questionnaire respondents giving specific examples of facts they had learned, a few visitors also made metacognitive reflective comments about their learning, such as stating that they hadn't known the information previously: "I learned from the trainers how long it takes to train a dolphin. I was surprised to learn that each has an identifiable personality and that siblings can influence each other's behavior."

Another visitor reflected that the learning had made the experience worthwhile: "We learned a little about dolphin anatomy, different dolphin personalities, and so overall it was a worthwhile experience."

A few other visitors talked about the process of learning, such as shown in this comment, "We observed them and…watched them above water, underwater, [and] learned about different parts of their body and how each dolphin is unique and different." Similarly, a different visitor said, "We learned about the dolphin, lot of questions, lot of answers, and we learned to do signals for the dolphins."

The fact that approximately half of the questionnaire respondents reported learning many different specific things suggests that they had reflected upon and remembered their learning in the human-dolphin interactions experiences. Questionnaire respondents wrote metacognitive statements about their previous state of knowledge in response to indirect questions as well as in response to the question, "What in the interactions surprised you?"[30] Some examples of these statements are, (a)

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[30] 87% of questionnaire respondents gave examples of things that had surprised them in the human-dolphin interactions.

"I didn't know how fast they could swim, about their breathing, or how they were trained" (2005 visitor); (b) "I didn't know that dolphins were warm blooded" (2008 visitor); (c) "I learned about their reproduction, their lives, their food intake and literally everything about them. I didn't know a whole lot beforehand" (2008 visitor); and (d) from a 2008 visitor:

> I didn't know that dolphins use their flippers to stroke one another. They are very loving to each other. I was surprised to learn how long they carry their young. I also didn't know that they nurse them for two years and stay with their mothers for five years or more. There were many things that I learned and it made me appreciate them even more!

The visitors had the advantage of learning through multiple means in the human-dolphin interactions. The variety of new information and visitors' detailed descriptions of factual information that they had learned about dolphins attests to the effectiveness of this approach.

Although the interaction time was short, making in-depth study an impossibility, none of the visitors reported having learned *factoids*[31], memorable snippets, such as the following statement that is commonly seen in children's books: "[A] blue whale['s] heart is the size of a Volkswagen Beetle" (World Wildlife Fund [WWF], 2009). The visitors' reports of what they learned about dolphin physiology and natural history were predominantly based on scientific knowledge.

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[31] I am using the term *factoid* to mean "a briefly stated and usually trivial fact," (Merriam Webster Dictionary, 2009); although the term, coined in 1973 by Pulitzer Prize winning author Norman Mailer, originally meant "a fact that has no existence on earth other than that what's appeared in the newspaper and then gets repeated forever after"(Lennon, 1988, p. 194).

Information about Zoological Activities

Visitors also learned a great deal about the care and training of dolphins in a zoological context. Although spectators were able to glean a general sense about these topics by watching from nearby, the visitors reported that they were both explicitly told about care and training and they watched the trainers explain and demonstrate various procedures, such as feeding the animals, providing enrichment activities, and training and implementing *medical behaviors*[32].

One visitor reflected, "All the medical things were fascinating." A questionnaire respondent who had participated in an in-water interaction sometime earlier in 2008 wrote that she "was surprised that so many of the activities done with the dolphins are actually training for health exams."

Not surprisingly, visitors connected their experience to their interests and previous knowledge. One visitor who identified herself as a medical professional talked at length in her interview about what she learned about the dolphins' health care, as shown in this excerpt:

> At first, we learned about some of the medical equipment that they use with the dolphins and the techniques that they go through with the training and how that's more successful than other techniques. And through the training, they're able to get the dolphins to respond to the equipment in a positive way, instead of being afraid.

Another medical professional, a visitor from 2002, reported being delighted by an experience that might not have thrilled the average visitor: "Because my boss was a

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[32] The dolphins are trained to do specialized voluntary behaviors in order for the veterinarians and research personnel to do medical examinations and collect biological specimens without using any physical or pharmaceutical restraints. For example, veterinarians and trainers can collect samples of blood, urine, milk, and stomach contents on a routine voluntary basis to monitor the dolphins' health.

physician and I am in the healthcare field, we also had the opportunity to assist the

trainer with obtaining a fecal sample from the dolphin. What a great experience!"

Several visitors mentioned that their experiences with dogs helped them make

meaning of the interaction experience with the dolphins, such as this interviewee's

statement: "It's amazing to see how they can interact with people. It's better than a

dog…I thought that they are smarter than a dog." Previous research has shown that,

"dogs are a common reference point for the public's understanding of dolphin

intelligence" (Sickler, et al., 2006, p. 35). A visitor from 2004 related the interaction

with dolphins to his profession as a dog trainer:

> I train dogs on a positive reward standard so the dolphin interaction
> experience reinforced my belief that it works. It was a great
> experience to see a mammal that was that large respond to positive
> reinforcement.

Visitors interpreted the dolphins' abilities to perform behaviors in response to

the trainers' hand signals as evidence of their intelligence. One visitor said, "You can

learn that the animals are really smart. They know each hand signal and what the

whistle means. Some people think they are dumb and they don't understand humans

but this experience teaches you that they have learned."

More than half the visitors said and about 10% of the questionnaire

respondents wrote that they were impressed with the dolphins' quick understandings

of so many specific behavioral cues, and a few visitors expressed some level of

appreciation for the time and patience involved in the training process, as seen in this

general comment from a visitor from 2001, "Training is much harder than it looks."

A few visitor comments indicated that the complexities and subtleties of

dolphin training were new concepts to them. For example, in the following remark, a questionnaire respondent who participated earlier in 2008 showed that he gained an understanding of the need for novel and varied activities for the dolphins as well as of the site's involvement in research:

> I didn't realize that the activities the dolphins do are training for them and that the dolphins are being studied for research too. Also it was interesting that everyone in our group didn't do the exact same thing, because they didn't want the dolphins to get bored. I learned a lot about dolphins in general too.

In addition to learning about the training for medical behaviors, another 2008 past-visitor expressed her surprise to learn about the trainers' high expectations for even a juvenile dolphin's behavior, and that a young dolphin might challenge those standards:

> The dolphins are kept for assisting in research and the training and activities they participate in are to prepare them for health activities, like check-ups. Also, the trainers vary activities to keep them from getting bored. One time a young dolphin came up close so we started patting it, but the trainer said not to, because she hadn't asked it to do that - so it was sort of misbehaving. That was a very interesting but surprising thing also.

Even a visitor from as long as five years earlier (2003) showed in the following remark that he had gained not only a sense of the technical aspects but also of some of the intangible aspects of training, such as the importance of knowing the animals' individual personalities and developing trust between the trainer and the animals:

> Although it's not all fun and games, the trainers are very lucky to interact with such beautiful creatures on a daily basis. I thought that the dolphins were trained to follow signals from the trainers…After being in the water with the dolphins and a baby dolphin, I realized how much work it is to know the personality of the dolphin and gain their trust.

When in the water, visitors gained firsthand experience of training techniques that were used as functional signals to elicit specific behaviors from the animals during the interaction session, but several visitors also saw potential in the training methods for a wider application. For example, one visitor said, "It's a testament to positive reinforcement techniques and can be applied in any situation in building relationships and trust."

Learning details about the care and training of dolphins is not something that is likely to be picked up casually during a typical visit to a zoological facility where visitors view the animals, and possibly their caretakers, from afar. By having the chance to talk to the trainers and ask questions, being able to watch demonstrations with the animals from close proximity, and trying out some of the trained signals themselves, visitors learned a great deal about the care and training of dolphins in the three zoological settings.

Information about Conservation

Many visitors said they heard information about conservation issues related to dolphins in the sessions and also about specific pro-environmental actions that individuals can take to benefit dolphins and their habitat, such as this example taken from a visitor's interview: "[The trainer] said something to us about recycling and how helping to keep the environment clean will help all kinds of species not just dolphins." Another visitor said the trainer had talked to her group about conservation topics and that "recycling and avoiding pollution" would help dolphins.

Almost all the visitors associated the interactions with conservation, even if the trainers had not talked about it. For example, one visitor said, "I don't think they mentioned anything about [conservation]." However, this visitor also said that people who care about dolphins would "support organizations that are trying to protect dolphins, whales, and other animals that live in the ocean…they can probably go to school and learn some stuff and volunteer."

The interaction sessions were relatively brief in duration (20 to 30 minutes) so the trainers did not have time to go into lengthy discussions about conservation issues. Both of the managers of marine animals at Lagoon and Cove sites and the supervisor of training at Bayside told me that one or two examples of stewardship behaviors to help dolphins might be presented in an interaction session. Nonetheless, some visitors talked about a variety of conservation topics in their interviews, as shown in this visitor's comments about behaviors to benefit dolphins:

> Not polluting the waters that they live in. Not dumping garbage into oceans….Not allowing the jet skis that go along and tear the ocean bottom up and probably harm the animals sometimes, too….I think I've read that there are certain fishing practices that sometimes harm dolphins with their big nets that sometimes catch everything.…Not buy products that are supportive of those practices....Obviously pesticides, that's a problem.…Purchasing organically-grown produce because all that eventually has an effect.

Similarly, another visitor who said she actually knew very little about dolphins prior to her interaction talked about doing conservation action on three levels, such as doing a routine personal behavior, making an outreach effort to share information with other people, and getting involved as a responder to an environmental emergency:

> [People who care about dolphins would] throw trash away in proper

places….Let people know that garbage goes to the ocean and hurts dolphins, and…go out and help take care of them if something happens, like an oil spill; they'd help and get their family [to help].

Through the human-dolphin interactions, visitors learned new information about conservation related to dolphins. They also drew upon prior knowledge and experiences to augment things they had learned about the dolphins, their care and training in zoological facilities, and about conservation.

Meanings through Connections

Visitors constructed meaning in and from the experience by connecting it to experiences, beliefs, and practices outside of the immediate interaction context. Although the constructs of experiences, beliefs, and practices are related since they influence one another, this section presents examples of evidence intended to illustrate distinctions between them.

It is striking that the brief interaction experiences held deep meaning for many of the participants. It is also noteworthy that almost everyone talked or wrote about conservation without being prompted to do so.

Connecting to Personal Experiences

About a quarter of participants talked or wrote about personal meanings that came from their interaction experiences. For example, a visitor who had participated nine years earlier (1999) remembered something that had a potential application to her

family: "[I learned about] behavior modifications strategies. I thought about using them with my unruly children."

More than 20% of the past visitors and a few of the visitor interviewees told stories about highly idiosyncratic meanings that came from their interaction experiences. For example, one interviewee became very emotional as she talked about how, through her interaction experience, she had learned to accept, even celebrate, her daughter's career choice, an issue that had been contentious until that time:

> I have an 18-year old and she wants to be a marine biologist. I mean to help her strive for her goal because I think it's something she's really going to love…My daughter wants to go to college to work with animals and to help the environment. It's a struggle for me because I want her to live comfortably and make a lot of money, but she wants to go to school to do more…I'm going to support her more on that now; not push her so much towards being a veterinarian or something where she could make a lot of money because I think I understand more now her desire to help the earth and these animals. So basically my postcard is to tell her that I want her to go to school and I want her to be one of the people to make a difference.

> Another woman, whose interaction was in 2005, wrote another poignant story:

> It was a life-changing event for me. I had been a care giver for my husband who was dying and before he died he wanted me to have a dream come true. To swim with the dolphins. They were so calm and content that I felt that calmness and it carried on with me. I think because of the dolphins teaching me to slow down and take life gracefully I am a richer person, and I handled my husband's death in a graceful way. I will never forget my time with the dolphins.

> For a visitor in 2002, the dolphin encounter held especially joyful meaning:

> It was one of the happiest moments of my life. We believe that the dolphins helped us to become pregnant after 16 years of trying.

> It is hard to know why some visitors made such implausible connections.

Perhaps they arrived at the interaction activity with beliefs of dolphins' healing or

other magical powers, ideas that are promoted by some New Age spiritual groups and some dolphin facilities. There is no scientific evidence to support the notion that dolphins have healing powers (Brensing, Linke, & Todt, 2003; Marino & Lilienfeld, 2007); and I saw no indications that such views were promoted by the research sites' employees or written materials. Furthermore, no interviewees or questionnaire respondents reported hearing this kind of information in the interaction activity. However, my data also do not show any evidence that the research sites addressed visitors' pre-existing misconceptions.

Participants' careers created another type of pre-interaction schema that had an impact on their learning. For example, in this community of animal enthusiasts, it was not surprising that several people mentioned that they worked with animals in their professional lives and were, therefore, particularly interested in learning about working with other animal species, in this case, dolphins. The following statement from a visitor in 2004 illustrates this kind of focused learning:

> I am an animal professional. It was a completely different experience to deal with the dolphins and watch them think it out. I work a lot with border collies and the dolphin was very much the same except in the water: always thinking and anticipating your next move. It was very valuable to learn about their cognitive process.

Other participants reported learning outcomes related to their specific personal interests, such as this comment from a visitor who had participated in 2007: "My husband and I are both music faculty members at [Name] University, and we were amazed at the variety of pitches the dolphins can sound." This study found, as

Heimlich and Storksdieck (2007) have stated, "The need of the individual drives what data are taken in, filtered, framed, and applied as meaningful" (p. 67).

Connecting to Familiar Beliefs and Practices

Visitors' comments reflected a number of beliefs or assumptions about themselves, other people, and the dolphins. For example, a few individuals held the prior belief that dolphins have healing abilities. A visitor who participated in the human-dolphin interactions several times, starting in 2002, wrote, "Any visit with the dolphins, whether we swam with them or not, was a healing experience. It reduced stress and allowed us to temporarily forget the demands of daily life."

A visitor from 2005 wrote that her interaction helped her heal emotionally: "It was part of my healing from an abusive relationship and it was a matter of learning to trust." Another visitor from early in 2008 commented on spiritual healing: '[The interaction] is a spiritual healing experience that is beneficial to humans." A few people said they believed that dolphins can heal the body, such as this example from a visitor who had participated six years in the past (2002):

> Some people say that if you get in the water with a dolphin, they can heal you; that day I had a sore on my leg that disappeared and healed right away after I got out! Coincidence?? I don't think so...I do think they have some special gift for healing."

Another more commonly-expressed belief was that it is possible for humans to feel an intangible connection with a non-domesticated and dramatically different species of animal, such as a dolphin. About a third of the visitors said that the interaction experience made them feel connected to the dolphins, as illustrated by

statements of four different people: (a) "There is a kind of communication;" (b) "You

learn the feeling…it is important to connect with animals…to respect the animals.

They are really like people but the best people;" (c) "There is a stronger connection

than I expected and I now have a desire to learn more about them;" and (d) "This is

the third time I've done it. I feel a bonding with the animals."

In addition to references to having a connection with the animals, more than

half of the visitor interviewees and a third of the questionnaire respondents used the

word *respect* about either their attitude or their perceptions of the trainers' attitude

toward the dolphins. For example, one visitor said, "The trainers have a lot of respect

for the dolphins." A visitor from 2007 commented that in addition to respect, the

trainers have strong feelings for the animals: "The trainers were excellent, great

resource of information and you could see the love, respect, and pride that trainers

have for the dolphins."

One visitor interviewee said that human-dolphin interactions help people "look

at the animals as sentient creatures as opposed to entertainment for us or [for] the ways

they can serve people. Also, [dolphins] are very familial so I think it increases

people's respect."

Another wrote in her postcard that she felt a sense of mutual respect with the

dolphins:

> One of the most meaningful behaviors that I have encountered is
> when a dolphin does nothing else but gaze right back at you. I get to
> experience a bond that few will ever feel. Experiencing a dolphin
> relax in your arms or turn to a side it wants rubbed is really
> unforgettable. I never want to forget the way they swim through the

water when they come to meet me. Or the look of what I consider mutual respect.

One topic that prompted discussion on the idea of respect was dorsal-fin towing. At least four visitors mentioned that, prior to their interaction, they had heard about or had seen pictures of other people hanging onto a dolphin's dorsal fin and being towed through the water, and they thought it sounded like fun. None of the three research sites allowed this activity in the interactions and, after their interaction sessions, these visitors brought up the topic. They all made comments that after having the interaction experience, they did not think it would be respectful to the dolphins. They suggested alternative ways to interact, such as shown in this visitor interviewee's comment, "You can learn to be nice to animals and people, to work together."

A couple of questionnaire respondents expressed similar ideas, such as this statement from a 2007 visitor: "Glad we didn't 'ride' them. My sister did this and I can't imagine dolphins doing that day after day and lasting long." A 2005 visitor wrote, "Some people want to ride with one--but they have to remember that they are a wild animal and not toys." However, there was also a handful of past visitors who said they had experienced dorsal-fin towing at other facilities and that it was a highlight of their interaction experiences.

The ways that some visitors talked about the interactions also suggested they believed that humans and dolphins shared the practice of having a variety of kinds of relationships. About a third of the visitor interviewees and a few of the questionnaire respondents explicitly used the word *relationship* when talking about the interactions between the trainers and the dolphins. For example, one visitor said, "It was neat to

see the interaction with the trainers and their relationship." A visitor from 2007

commented on the quality of that relationship with these words, "The trainer and the

dolphins seem to have a very close and loving relationship and they really feed off of

each other and the dolphins seemed to enjoy showing off/performing for the trainer."

The belief that humans could and did have relationships with the dolphins did

not appear to strike visitors as unusual and a few people expounded upon their

relationships with other animals, as shown in this remark from a visitor from 2007:

> I own horses and feel that they also give off the energy similar to the
> dolphins. Horses are like dolphins on four legs, same magical
> wonderful feeling when I am around both species. As I have always
> had pets, relationships with animals give me great joy.

A visitor in 2004 wrote this vignette about her relationship with animals:

> Growing up I spent a great deal of time on my grandparents' farm and
> around horses. There were always dogs, cats, cows, and horses
> everywhere and I loved all of them. I have always had a way with
> them, as if they understand when I would ask them something or talk
> to them. I definitely have a connection especially with dogs and
> horses.

Changes in visitors' beliefs about dolphins' capacities for mutual trust and

respect, and their association of the dolphins to the practice of relationship, seemed to

map onto visitors' experiences with other animals, especially pets. In many cases,

these beliefs appeared to also affect changes in the visitors' attitudes about how

dolphins should be regarded and treated.

Connecting to Conservation

Visitors gave many examples of the kinds of stewardship behaviors that a

person who cares about dolphins would do, such as, "recycling," "buying dolphin-safe tuna," "keeping pollution out of the ocean," "cleaning up the beach," and "supporting organizations that protect dolphins."

A couple of interviewees expressed cynicism about other people engaging in stewardship behaviors. For example, one visitor said, "I'd be surprised to find out that [people who love dolphins] were doing anything in particular [to help them]. [Maybe] giving money…Environmentally, I don't know that people make changes."

The questionnaire data provided evidence of how the interactions had changed past-visitors' viewpoints about conservation behaviors. Most of the past visitors said that they continued to care about dolphins and the environment long after their interaction experience. For example, a visitor from 2006 wrote that the experience motivates people to learn about ways to protect dolphins:

> I think people learn so much more about the dolphin and their unbelievable intelligence and just details that they ordinarily would not really know or pay much attention to. It is different being in the water with the dolphins, the feeling is hard to describe. [It's] just a wonderful feeling to be able to interact with them. It is amazing. Because of this, you want to learn more how to protect the dolphins.

Another visitor who participated earlier in 2008 said the interaction engendered greater awareness and respect for more than just dolphins: "I think the experience gives people a greater respect for other living things. It also makes you more aware of how important it is to take care of our environment to protect both ourselves and other creatures."

Several visitors said that they thought the human-dolphin interaction sessions could inspire significant changes in one's personal life, as shown in the following

comment in response to the questionnaire: "Dolphin interactions can be a life-changing experience if done in the right facility. I think they [not only] teach a lot about the animals and training, but also [they] inspire conservation of our environment and wildlife" (2008 visitor).

In addition to making connections from the human-dolphin interaction activity to conservation in an abstract sense, most visitors also responded to the interactions on a personal level that involved their attitudes.

Attitudes and Sense of Agency

Visitors shifted their attitudes and gained senses of personal agency about beginning or increasing their own stewardship actions. Through the interaction activity, they learned that they had the capacity to act in specific ways that would benefit dolphins and the ocean environment, in general.

Attitudes

Most visitor interviewees said that through interacting with the dolphins they learned to care more about dolphins and the environment. For example, one visitor said, "Humans think they own the planet. [Interacting with the dolphins] is humbling and gives you more appreciation for marine life and taking care of the planet and ocean. We need to have respect for the earth."

A few questionnaire respondents wrote that engaging in the interactions taught them to have compassion for dolphins. For example, a man who participated in 2002

said he gained "A strong sense of compassion for these animals. [I] wish for their well being and continued existence." A visitor from longer than a year earlier wrote, "It really made me think about how we need to respect nature and all living things. I felt a lot of compassion for them after seeing them up close and learning about how they acted and even felt."

For some visitors, the compassion extended beyond dolphins to other animals. Different visitors wrote that people can learn (a) "compassion for animals, conservation of ocean life, [and] how smart and amazing dolphins are" (2005 visitor); and (b) "compassion for other intelligent animals sharing this planet" (2002 visitor).

Other past visitors expressed beliefs that the dolphins showed compassion for the humans: (a) "I now know first-hand that [these] animals are intelligent, friendly, fun-loving, and compassionate. I always knew this [in an abstract sense], but to now know it from my own experience is different" (2005 visitor); (b) "[People can learn about the dolphins'] intelligence, playfulness, intuitive, and compassionate nature because they are intelligent, friendly, fun-loving, compassionate animals" (2006 visitor); and (c) "I had always dreamed of swimming with dolphin but I never in a million years could expect to see how compassionate, entertaining and smart they really were. In some ways they are very nurturing animals" (2007 visitor).

Such attitudes about the capacity for caring and the perceptions that the dolphins showed reciprocity of caring resulted in many visitors' sense of caring *about* dolphins to evolve into a sense of caring *for* them.

Agency: Intended Stewardship Behaviors

In their interviews, visitors talked about stewardship activities that they intended to do themselves. Some of the specific actions mentioned included the following: (a) "[This experience] encourages me to recycle and help keep the beach clean;" (b) "After this, I know I don't want to swim with wild dolphins and disturb them;" (c) "I will renew my efforts to only eat sustainable seafood;" and (d) "I will work harder at recycling glass and newspapers."

Although visitor interviewees expressed the need for or the desire to do conservation activities to help dolphins, it is impossible to know if any of them followed through on their concerns and intentions once they returned home. However, the fact that visitors talked and wrote about their intended stewardship behaviors in response to open-ended questions that had not been preceded by conservation-related words that might have cued them on the topic of stewardship shows that thinking about their interaction experience triggered stewardship intentions.

Agency: Reported Stewardship Behaviors

In addition to writing about their views on the connection between the human-dolphin interactions and conservation behaviors and their intentions to do stewardship activities, questionnaire respondents also wrote about how their interactions with the dolphins reinforced their involvement in stewardship activities. They further reported that the interaction experience had prompted them to begin doing pro-environmental behaviors in their personal lives.

In the questionnaire, Questions 16 (of 21) specifically addressed conservation by asking respondents to indicate on a list of stewardship activities the behaviors they would expect people who care about dolphins to do (see Appendix D). Question 17 then asked, "Understanding that some respondents may not have cars, own a residence, or have a garden, of the 16 conservation activities listed in the last question that are relevant to you, how many do you do most of the time?" 925 people (99% of the sample) answered this question (see Figure 6.1).

16 Stewardship Activities
Carpool
Combine errands in the car
Use public transportation
Keep thermostat low in winter & high in summer
Use energy-efficient light bulbs
Limit garden water use
Take short showers
Buy only sustainable seafood
Buy energy-efficient appliances
Use natural methods of pest control in the garden
Maintain a compost pile
Do beach or stream clean-ups
Recycle motor oil
Recycle paper, plastic, & glass
Donate to conservation organizations
Write letters to policy makers on behalf of the
    environment

Figure 6.1. Questionnaire respondents (n = 925) reported how frequently they engaged in sixteen stewardship activities.

In a comment box asking for "other" stewardship activities that might benefit dolphins, 118 respondents (13%) wrote additional stewardship activities that included,

"[promote] solar energy," "support zoological facilities that educate about dolphins," "don't use bleach or phosphates," "vote for candidates who support these issues," "drive hybrids," "don't release balloons to the sky," among others.

In another question, respondents were asked if interacting with dolphins inspired them to do something in their personal lives. Almost half (n=462) of the questionnaire respondents listed activities that could be categorized as "stewardship activities" among the things that they had been inspired to do because of their interaction experience. Many of them expressed sentiments similar to this comment from a visitor in 2003: "I have stepped up my conservation efforts."

Most of the 462 people reported having done specific stewardship behaviors as illustrated by the following statements from past visitors: (a) "[I am more] conscientious about the impact that those kinds of human daily activities have on marine animals" (2007 visitor); (b) "[I] watch my water waste and pick up trash at the beach" (another 2007 visitor); (c) "[I] always cut the plastic soda holders so the animals don't get caught in them" (2002 visitor); (d) "I have purchased cloth grocery bags and take them with me when shopping" (a visitor from earlier in 2008); (e) "[It] added more of a reason to think and act 'green' for all of earth's creatures" (another 2008 visitor); and my favorite testimonial is, (f) "Whenever my husband is running water I say, 'Think of the dolphins' and he turns the water off" (2007 visitor). Once again, we have no way of confirming these self-reported behaviors. However, because the online questionnaire was anonymous, there was no benefit to the respondents to exaggerate their behaviors. The very fact that they took the time to write down details

of their specific stewardship activities shows that they linked stewardship activities to the interaction experience and it suggests that they valued such actions.

Skills

It was somewhat surprising that visitor participants reported having learned new skills through the human-dolphin interactions, considering the short duration of the activity. However, analysis of the data revealed evidence that they considered themselves to have learned skills related to interacting with dolphins. Eighty seven percent of the interviewees and 60% of the questionnaire respondents reported learning how to approach a dolphin, where to touch it, how to feed it, how to give a few hand signals to cue trained behaviors, and how to relate to it. I am calling these actions *dolphin etiquette skills*.

Obviously, the visitors could not master the skills of dolphin training within the brief time they were in the water during a typical interaction with the dolphins. However, much like one needs to learn some basic concepts about approaching a horse[33], or how to safely approach a dog for the first time[34], visitors learned a few basic skills about how to interact with dolphins in the water.

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[33] Some common etiquette tips on handling horses include: "Approach from its left shoulder. Speak to your horse and keep your hands on it when moving around it. Even if a horse is aware of your presence, it can be startled by quick movements. When approaching from the rear, advance at an angle. Speak to the horse, make sure you have its attention, and touch it gently as you pass by its hindquarters" (National Institute of Occupational Safety and Health and the University of Missouri, 1994)

[34] Some basic etiquette tips for meeting a strange dog are to, "Curl your hand into a closed fist with the back of your hand facing upward. Extend your hand slowly to the dog. Allow the dog to sniff the

Visitors acknowledged that they did not have dolphin etiquette skills prior to their interaction session, as shown in this comment from a visitor in 2005: "I think the trainer is an important participant. I would not know the first thing about how to interact safely and successfully, or what activity was possible [without the trainer]." Here is the way one visitor from earlier in 2008 described these skills:

> I know a little about how to position my hands so that the dolphin finds it "safe" to come to me and feels comfortable resting her/his beautiful head within my "cupped" hands; I know how to move carefully, as not to frighten these "beauties."

Another visitor from two years in the past commented on how she was successfully coached to give hand signals to the dolphin:

> I knew dolphins were intelligent, but to actually be able to give her hand signals and have her follow them through, was most surprising to me. The trainers have been very skillful in their job so that the dolphins also respond to amateurs!

A 2001 visitor wrote, "[People can learn that] it's like meeting a small child for the first time. [Visitors] should not be over eager but should approach the dolphin similar to an introduction with anyone and rely on touch for initial introduction."

Most visitors spoke about the importance of having the trainers teach dolphin etiquette skills. For example, a visitor from earlier in 2008 wrote:

> [I was surprised] that the dolphins were so different. At first they all looked alike. I wondered how the trainers could tell them apart. Being able to work with several dolphins I quickly was able to tell them apart. Also their personalities were different. Some were bold and friendly, others shy. I feel extremely lucky and privileged to have had this experience.

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back of your hand…After the dog has sniffed your hand and has become familiar with you, pet it gently under the chin or on the chest" (American Kennel Club, 2006).

One visitor reported that the trainers had shown her group some basic hand signals but that she wasn't sure she had really learned them: "We learned how to do some--we didn't learn them but they showed us how to do some of the hand motions to go ahead. I don't know if I could repeat them." Later in the interview, however, this visitor implied that she and her family had actually learned quite a bit. She said: "We called [her mother] as soon as it was over. My kids all talked to her, 'Grandma, we got to pet the dolphin. Grandma, we learned this stuff. Grandma…' and they all told something different."

When asked how the interaction experience might have been different if they had gone into the water alone with the dolphin without the trainer present, most visitor interviewees and questionnaire respondents talked about not only the educational and safety benefits of having the trainers present but also how the trainers taught necessary skills for approaching and touching the animals. For example, one visitor said, "I wouldn't have liked [to have been in the water without the trainer]. I wouldn't have known what to do with the dolphins and I wouldn't want to confuse them." A past visitor from 1998 wrote, "I think I would still want a trainer there to show me what to do." Even a visitor who said she would like to interact with the dolphins alone qualified her response with, "If the trainer would teach me how to interact, I would love it." Visitors considered the trainer's guidance about interacting with the dolphins to be an essential and beneficial aspect of the experience.

Long-Term Impact

Visitor participants remembered what they learned in the human-dolphin interactions for a long time. In addition to the many examples of the past visitors' detailed comments about the information and skills they had learned, and about the meaningful connections they had made, the questionnaire responses also showed that the intensity of the emotions did not diminish over time for most past visitors.

In responses to the first open-ended question in the questionnaire[35] that asked, "What comes to mind when you think of your experience interacting with dolphins," the majority of past visitors wrote impassioned statements, such as this one from a visitor from eight years earlier:

> It was so moving to me to be with the dolphins that even eight years later, when I think of it, I feel like crying. I remember their smooth skin, their knowing looks, and their happy, energetic movements. I wished I could know them more/longer.

A visitor whose first interaction was ten years in the past wrote that what came to her mind was, "Peace, a connection like no other. True joy. I know I left each of my experiences with a renewed sense of well being, like they had tapped my soul."

A 1990 visitor responded to the question by writing that the human-dolphin interaction that she had experienced nearly two decades earlier held extremely high significance in her life:

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[35] This question was numbered Question 5 and was preceded by four questions related to demographics and dates. It was the first question related to the actual interaction experience and was not preceded by any words or topics that might have led the respondents to write about feelings, activities, attitudes, or thoughts related to any particular subject matter, such as conservation (see Appendix D for the complete survey).

> This was the most wonderful experience of my life, other than having my children. The dolphins' response to the trainers & visitors was far above my expectations. Touching the dolphins was an experience that still makes me weep, as I am now. It is almost a mystical experience. Feeding fish, touching, kissing, giving hand signals were all things I could never have imagined being so overwhelming.

Attributing such profound significance to the human-dolphin interaction experience was not unique to that visitor. More than 10% of the 933 questionnaire respondents wrote that the human-dolphin interaction was a peak or significant experience in their lives, such as the following response from a 2005 visitor who described herself as mature and well-traveled:

> At the time of my interaction, I was 52 years old. I have admired dolphins since I was a small child. I have traveled quite a bit, and nothing compares to the experience I had swimming with the dolphins and my family…The most amazing thing that I have ever done. Spectacular!

Reflecting upon the experience caused strong emotions to resurface in many past visitors, such as in a visitor from 2006 who wrote these comments about her interaction experience:

> Best thing I ever did, I am 62 years old and thought it was an experience that I would never get to do, and being in the water with them, petting them, THE VERY BEST OF ALL!, seeing how well they respond to their trainers and us. Still makes me smile and cry with JOY remembering the experience!

Another questionnaire respondent who participated in her interaction with dolphins in 1990, 18 years in the past, not only considered the interaction to be a peak experience in her life but also remembered her feelings at the time: "It was the most wonderful experience I have ever had in my life. The dolphins were very calm and playful. I never felt scared at any time that they would hurt me."

For a 2005 visitor, the memories of the interaction were very vivid: "Even three years later, I can still visualize every moment from that day!" These types of strong statements show that the interactions had a strong positive emotional impact and that visitors remembered these interaction experiences for a long time.

Chapter Summary

By watching from close proximity, listening, touching, experiencing sensations kinesthetically, and participating within a social context in interactions with dolphins and trainers at three zoological facilities, visitors learned new information and skills, made connections outside of the immediate context, changed their attitudes and sense of agency in regard to stewardship actions, and remembered what they had learned for a long time.

The data indicate that the human-dolphin interactions were powerful experiences for visitors. This category of participants had a lot to say about the interactions and their descriptions provided noteworthy evidence that visitors' perceptions of the experience and what they learned, and their strong feelings didn't diminish over time.

The multisensory impact of the being in the dolphins' environment is highlighted by contrasting it with the spectators' experiences in the next chapter. Chapter VII focuses on the findings as they relate to the spectators, the category of participants who watched the human-dolphin interactions but did not get into the water with the dolphins and the trainers.

VII. SPECTATORS' LEARNING: FINDINGS AND DISCUSSION

This chapter reports and discusses the findings in relationship to the spectators, those who watched the human-dolphin interactions at the three research sites but did not, themselves, go into the water with the animals and trainers. The evidence presented is based on interviews of 16 spectators[36].

Three principal findings about learning directly apply to the spectator category: (a) spectators gained new knowledge in three categories (dolphin physiology and natural history, zoological activities, and conservation information); (b) spectators constructed meanings by connecting the interactions to concepts and experiences outside of the immediate context; and (c) spectators shifted their attitudes and gained a sense of personal agency about beginning or increasing stewardship actions.

Observation was of primary importance to the spectators' participation. This chapter begins by describing the means by which spectators learned and contrasts them to the methods of learning of the visitors, as discussed in the preceding chapter.

The Means by Which Spectators Learned

Spectators participated as onlookers from close proximity. They could not hear much, if any, of the trainer's comments or the visitors' conversations in the water. They did not touch the animals or experience the sensations of the water movement

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[36] All the quotes in this chapter are from spectator participants, unless otherwise designated, and have been edited only for clarity.

resulting from a dolphin swimming close to them. Although they did not personally interact in the water with the trainers or the visitors, the inherent social nature of the activity facilitated their learning because they watched groups of people, "just like me" involved in the activity. They could identify vicariously with those in the water. As one spectator commented, "I would say it's very exciting to watch somebody else go through the process."

In this Community of Practice (CoP), the spectators participated in the interaction activities from the most peripheral position as onlookers. We know from the literature that people can learn a great deal from watching others (a) engage in everyday activities (Bandura & Huston, 1961; Rogoff, 2003; Rogoff, Paradise, Arauz, Correa-Chavez, & Angelillo, 2003); (b) do complicated work, such as making clothing in the Vai and Gola tailors' apprenticeship, described by Lave and Wenger (1991); and (c) perform a task during a brief museum visit, such as in the study by Tulley and Lucas (1991) where visitors who first watched another visitor assemble a lock mechanism could assemble the lock themselves faster than those who hadn't watched. So it is not surprising that these on-looking participants also learned.

Watching the dolphins' behaviors and observing their anatomical features were the primary means by which the spectators learned about the animals. Spectators' learning was also influenced by observing the trainers and other participants in this CoP. The spectators talked about what they saw and, more importantly, how they interpreted their observations. For example, one spectator said, "It looked like a lot of

fun, and it was a great way that you can know about the [dolphins], especially for the kids, for them to get to see this type of wildlife up close and in action."

Although the spectators received no intentional instruction during the human-dolphin interactions, they made sense of their experiences through active appropriation, described by Rogoff (1995, p. 142) as, "the personal process by which, through engagement in an activity, individuals change and handle a later situation in ways prepared by their own participation in the previous situation. This is a process of becoming, rather than acquisition."

The spectators' single method of learning through watching contrasts significantly to the multiple means of learning available to the visitor category. Not only could visitors watch the animals and the other people engaged in the interactions from immediate proximity but also they could listen to the trainers' conversations, ask questions, touch the animals, experience the physical sensations of being immersed in the water, and interact with the others in their group. However, despite their peripheral position to the interaction activities and their reliance on observation alone, spectators still reported gaining new knowledge and understandings

Knowledge

Spectators reported learning new information in the areas of: (a) dolphin physiology and natural history; (b) zoological activities, such as the care and training of dolphins; and (c) conservation, such as environmental issues and stewardship actions related to dolphins.

Information about Dolphins

Spectators' comments related to dolphin information focused on their visual impressions, as seen in the remarks of these three spectators: (a) "[I noticed] the size of the animal," (b) "They're not as big as I thought," and (c) "…these [are] huge animals." About a third of the spectators called the dolphins "gentle" and some called the dolphins "intelligent," based on the dolphins "being able to do such complicated behaviors."

Although the spectators' opportunity for learning factual information was limited to watching from a peripheral vantage point, more than half of the spectators said they thought the in-water participants were learning information about dolphins, such as shown in these three comments: (a) "They learned a lot about the dolphins, such as touching, feeding, and how they feel;" (b) "You can learn about the animals themselves, they're mammals, and things. You can relate what you see to your existing knowledge and it will last longer;" and (c) "At first I thought it'd be great because it would be fun but my son was actually learning things that I'm sure he didn't know and he's very interested in marine life." All spectators expressed the opinion that those doing the in-water interactions could learn a great deal in multiple categories. Some called the interactions "very educational."

Information about Zoological Activities

Despite the fact that they couldn't hear the trainers' narration, the spectators' comments indicated that, just by watching, they were able to gain some understanding

about the zoological activities related to the training of dolphins. More than half of the spectators talked about being "fascinated" or impressed by the trainers' techniques to get specific behaviors from the dolphins on command. From what they observed, different spectators said they gained awareness of the following zoological activities: (a) "the ability to train effectively;" (b) "the trainers teaching some of the commands to the people so they could do the tricks themselves;" and (c) "[It was] unbelievable to see the way the dolphins respond [and how the trainers] could direct the behaviors."

Information about Conservation

Because most spectators were too far away to be able to hear much, if any, of the conversations between the visitors and the trainers in the water, their comments about conservation must have come from their reservoirs of prior knowledge. Not only could they not hear any of the trainers' comments regarding conservation topics, but the trainers did not talk about the wide array of conservation topics that various spectators mentioned. What is noteworthy is that the activity of watching other people interacting with dolphins made onlookers spontaneously think about conservation and stewardship behaviors about which they had learned in other contexts.

In the interviews, collectively, the spectators talked about a wide variety of pro-environmental actions that they related to caring about dolphins, including these activities: (a) "prevent litter and pollution," (b) "recycle and reuse things," (c) "purchase biodegradable products," (d) "protect the coral reefs," (e) "donate money," and (f) "vote for politicians who support the environment."

Meanings through Connections

The spectators made sense of watching the human-dolphin interactions by making connections to their existing experiences, knowledge, and familiar constructs.

Connecting to Personal Experiences

The experience of watching the human-dolphin interactions prompted a few spectators to connect the experience to personal aspects of their lives. For example, one spectator, watching for the first time, identified himself as a doctor and said that he'd had a number of patients interact with dolphins as Make-A-Wish activities. Although he had seen photos of those children with dolphins, he said that watching the interactions for himself gave him a new perspective on the personal and customized nature of the interaction experiences and how a sense of trust and friendship was possible for in-water participants: "I didn't realize the intense standard they did it and I was very impressed how [the trainer] got [a disabled adult visitor] to trust…in a very brief time, she got her faith and trust."

This spectator said that he felt inspired to encourage his patients and their families to do the dolphin interaction experience because, "For the kids, they realize that the animal is not afraid of them. There's more of a comfort level with the [disabled] people. It's got to be a tremendous boost of confidence, the accepting attitude of the animal." He went on to say:

> These kids come on vacation with the family and they don't get to do anything, just sit in a wheelchair and watch everybody else have fun.

> The idea that you can get into the water and interact with this big animal and it's like friend to friend. That's phenomenal! … You can be engaged in that kind of closeness and it's got to be tremendously heartwarming. Because, to them, it's not one of a thousand thrills, it may be the biggest thrill of their lives to have that interaction.

This type of comment shows that viewing the human-dolphin interactions had a personal meaning to some spectators, inspiring them beyond the momentary act of watching an entertaining activity to think about doing follow-up activities, such as recommending the experience to others.

Connecting to Familiar Beliefs and Practices

Other comments from spectators showed that they connected the human-dolphin interactions to familiar beliefs, such as concepts of trust and respect. For example, one woman said, "[The dolphins]…roll over on their backs and it's amazing because that's a very vulnerable position. They obviously trust the people."

Several of the spectators used the word *respect* when talking about the interactions. One woman said, "The respect of the animals was very apparent." Another said, "[People can learn] respect for animals." A sense of respect for the human-dolphin interactions was apparent in this spectator's enthusiastic remarks:

> It's a marvel. It's so special. It's like viewing a small miracle that there's intelligence in what we call a wild form of life. It was so pleasurable to see the interaction, to see wildlife understanding directions…I was impressed by the obvious joy of the people in the water.

The notion of mutual respect and trust was reflected in comments of more than half of the spectators who talked about dolphin attributes in terms of human qualities.

One spectator said, "I wouldn't say that they have human characteristics but they seem to." She and several others made various comments about "How intelligent they are." Examples of different spectators' reflections about the human-like qualities of dolphins include: (a) "They have feelings and thoughts," (b) "Dolphins seem to have human characteristics," and (c) "Every dolphin is different and they have personalities." One spectator wrote in her postcard to her students, "Maybe one day you will be able to see a dolphin up close but, if you do, remember they are animals that have feelings too."

Although they did not personally interact with the dolphins, spectators said that the dolphins displayed intentional regard for the people in the water. Different spectators interpreted such behaviors as displays of the familiar practice of friendship, a specific type of relationship between people that is typically cooperative and mutually supportive. Spectator comments about the dolphins' part in this relationship included: (a) "They're extremely friendly," (b) "They have a very friendly interaction with humans," (c) "I would tell [children back home] about the interactions with humans and how friendly they are towards humans," and (d) "Once you've seen how friendly they are, you go away with ideas you didn't have before."

Another spectator viewed the interactions as a means of developing an emotional tie or feeling empathy for dolphins, as shown in his comment:

> You can start to have, if you didn't have it beforehand, empathy for creatures other than humans. It's more of an emotional tie to other life; I think that's what people learn. You just fall in love with them.

One spectator equated concern for and caring about the dolphins to concern for

the welfare of another human with whom you have an emotional tie or a relationship:

> When someone you care about or love lives [where a disaster strikes], your first thought [is their welfare]. I am hoping that people who see this will say, "Oh my god, I can't believe it. That [some activity] might kill dolphins or that oil spill has killed all these dolphins." When you have that kind of emotion, it's sort of like somebody you know or at least someone you can relate to, it makes a huge difference. Because most people don't give a flip, unfortunately.

Spectators said that, not only were the dolphins friendly to the visitors in the water, but also that the dolphins and trainers had "a relationship." More than half of the spectators talked about observing how the trainers interacted with the dolphins. For example, the trainers' manner put one spectator at ease, judging by her comment, "I watched the trainers. They were extremely gentle and kind; the animals, too. I had no worries...My daughter can learn how complex the interactions can be."

Another spectator related his observations of the trainers' interactions with the dolphins to a more familiar animal: "It looked like a relationship going on that was kind of nice. It reminds me of the relationship between a dog and man." A different spectator who identified herself as a psychologist also interpreted her observations of the human-dolphin interactions to be similar to interactions with a dog:

> I believe that the way [the dolphin's] brain is functioning is, cognitive wise, very close to human beings. That's why they enjoy the interaction with humans because they can think like humans. The way they interact with the humans is just like the interaction between a dog and a human.

Most of the spectators remarked about their impressions of the dolphin-trainer interactions. For example, one spectator attributed the ability to have preferences to dolphins when she said, "The dolphins wanted to be with the trainers more than with

the visitors." Another said that she had always considered dolphins to have some kind

of a relationship with humans and that, after watching the interactions, she realized

that, "The bond and trust is close and complex." In her postcard, she wrote:

> As I watch the dolphins interacting with the human trainers I gain a high respect for both as the behaviors asked by the trainers seem to be quite complex (done by the dolphin). The bond between the dolphin and trainer must be very strong for such immediate and sometimes complex responses from the dolphin. As a viewer, my feelings and emotions are indescribable because of the mutual understanding between a marine mammal and the human trainer.

This belief of an inter-species connection reinforced and/or built positive

attitudes of appreciation, respect, and caring for dolphins that were also reflected in

the spectators' comments about conservation.

Connecting to Conservation

Eighty one percent of the spectators made comments that linked the human-

dolphin interactions to a general need or a desire to protect dolphins and their habitat.

For example, a spectator who seemed knowledgeable about conservation issues said:

> These experiences create a better understanding of our animal populations of the whole earth. The dolphins instruct us. They're like an ambassador…We have to clean up the ocean, get rid of the plastic containers…shouldn't have litter on the beach…We've got the problems [like]…the boat strikes, manatees being all chopped up… sewer outfalls, cruise ship dumping, oil seepage…a whole "dead zone" on the coast.

Other spectators talked about what they hoped the in-water participants were

learning and would do to help the ocean and nature, in general, as shown in the

following spectator comment: "I hope that programs like this would help people want

to take care of the ocean instead of soiling it as we have been doing."

The spectators' comments generally indicated that they believed that the interactions were beneficial learning experiences for those in the water. For example, one spectator said that he thought it was "good for children." Another spectator commented as she was leaving the interview, "We can learn a lot about marine life that's so different than how we live life. We can learn so much more. This experience allows people to have a tiny glimpse that makes them know more."

Some spectators suggested that the experience was beneficial not only for the participants in the water but also for themselves as watchers. For example, one spectator spoke about the value of participating in the interactions in this way:

> I think that [the interactions] can create a better understanding of our animal population of the whole earth, you know. Not just dolphins. The dolphin can be the one to instruct us on how to get along with animals…They're an ambassador of the marine life and we could get along better with the whales and the other animals in the ocean.

Even the only spectator to say that she would not seek to have an interaction herself (because she had been rammed by a dolphin in the ocean one time), expressed a positive attitude about the interactions when she said that, in these experiences, people can learn "appreciation of this animal and [the experience will make them] want to learn more about the environment."

Attitudes and Sense of Agency

It is striking that, even though their peripheral participation did not allow them to hear discussions about conservation, the act of watching the human-dolphin

interactions made almost all the spectators think about the need to protect dolphins and their environment. Most spectators said that watching the interactions reinforced or heightened their positive attitudes about dolphins and their environment.

The words that one spectator wrote on her postcard illustrate this point: "I was able to view how amazing dolphins are. This reinforces my belief that we should protect our oceans and the animals in them."

Spectators' comments suggested that their new or reinforced attitudes were part of the process of understanding the implications of one's own actions on the world and the potential to change these actions. Although only a few spectators talked about specific stewardship behaviors that they intended to do, several said that watching the interactions made them want to identify specific actions that would benefit dolphins. For example, one spectator wrote on her postcard:

> I had the most amazing experience today watching a dolphin interaction demonstration. The abilities these animals have to relate to humans – even ones that are physically or/and mentally challenged was most heartwarming to watch. These animals are so special that when we get home, we will explore ways to help these incredible animals to have a better future.

Chapter Summary

In the perspective of a CoP, it was expected that even the spectators, those who participated from the periphery through watching others, learned many things. Although not interacting with the animals and co-participants directly, the social nature of the community activity influenced the spectators. Their perceptions that those in the water were having fun and learning contributed to their own enjoyment

and learning, and to their ideas that others would also benefit from the experience.

The spectators were able to observe living dolphins in close proximity, for an extended period of time, and as they were engaged in a variety of activities, including calmly relating to and interacting with humans. Such an opportunity is unlikely to occur in the wild, and it is quite different from watching dolphins perform in shows, especially shows that emphasize high-energy behaviors, such as flips and high jumps.

Watching the interactions enabled spectators to learn information about a dolphin's size, their intellectual capabilities, the diverse repertoire of their behaviors, the social dynamics among the dolphin cohort, and the training of the dolphins. By observing the humans interacting with the dolphins, spectators gained a new or stronger sense of caring and respect for dolphins that, for many spectators, reached beyond just dolphins to include the broader animal and ocean environment.

Perhaps the interview questions prompted the spectators in this study to reflect upon and articulate their thoughts about their experience as observers more than they normally would have. However, in this study's view that learning is "a continuous process that goes on throughout life…[and every event] is assimilated in terms of what has gone before" (Brown & Duguid, 1996, p. 2), the spectators likely learned through their participation, whether or not they talked to a researcher.

In the next chapter, the discussion shifts from the peripheral position of the spectators to the most central position in this CoP, the trainer category. It presents the findings as they relate to the trainers' learning through their participation in the human-dolphin interactions.

VIII. TRAINERS' LEARNING: FINDINGS AND DISCUSSION

This chapter reports and discusses the findings based on the interviews of 20 trainers[37], the employees of the three research sites who worked directly with the animals every day and guided the interaction experiences. Although the trainers' initial comments about learning in the human-dolphin interaction sessions focused on the visitors' learning, they all reported that they too had learned many things. The trainers gave many long and detailed answers in their interviews and provided examples of long-term impact of the human-dolphin interactions.

Four principal findings directly apply to the trainer category: (a) trainers gained new knowledge in three categories (dolphin physiology and natural history, zoological activities, and conservation information); (b) trainers constructed meanings by connecting the interactions to concepts and experiences outside of the immediate context; (c) trainers shifted their attitudes and gained a sense of personal agency about beginning or increasing stewardship actions; and (d) trainers honed their existing and learned new training skills with the animals, and expanded their interpersonal and group-management skills with the visitors.

There is clear evidence that was woven throughout their interviews that the trainers' experiences with the dolphins had a long term impact on them. However, it was not possible to distinguish the impact of the public human-dolphin interaction

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[37] All the quotes in this chapter are from trainer participants, unless otherwise designated, and have been edited only for clarity.

sessions from the trainers' other activities with the dolphins. Furthermore, the trainers were involved with the dolphins on a daily and ongoing basis so one would expect the dolphins to be at the forefront of their minds. A longitudinal or cross-sectional investigation of the long-term impacts of being a dolphin trainer, especially one that included current and former trainers, could provide greater insight about this topic.

This chapter begins with a short profile of the trainers in this research. Next, it describes the means by which the trainers learned. The rest of the chapter presents the evidence that supports the findings and also shows the passion and intense dedication that defines the trainers' participation.

Profile of the Trainers

In this study, the trainers' experience conducting dolphin interaction sessions ranged from 14 years to "less than a month," with the median at four years. For some, the dolphin interactions were the totality of their experience as animal trainers and/or with marine mammals. Others had various and sometimes extensive experience working as trainers, interns, and volunteers with other marine mammals, including being on stage in dolphin or whale shows. In addition to working as marine mammal trainers, these participants talked about a diversity of previous careers that included working as a field biologist, a professional gymnast, an agility dog trainer, a trail guide with horses, a photographer, and three of them had worked in the education departments in either their current or other zoological facilities.

By virtue of their job, at minimum, the trainers had spent concentrated time

with dolphins, many of them over the course of several years. In addition to seeing

how each animal dealt with social and learning challenges, the trainers also engaged in

the intense labor of animal care. Without exception, the trainers were friendly and

helpful. To be available for an interview, they and their supervisors shuffled normal

duties or, on occasion, they stayed after working hours to be interviewed.

The Means by Which Trainers Learned

The trainers, as the most central human participants in the Community of

Practice (CoP), had access to all the learning methods of the visitors (seeing, hearing,

conversing, touching, and feeling sensations through the water). Additionally, because

they were cast in the role of teachers, they actively worked on learning new and better

ways to present information, organize the interaction activities, handle the dolphins,

and manage the visitor groups. The process of preparing for and guiding the

interaction sessions resulted in the trainers learning different kinds of things than

either the spectator or visitor participants learned, such as (a) how to tailor their

presentations of content to the level of interest and background of the visitors, and (b)

group management skills.

Although the trainers acted in the role of the experts in the interaction activity,

they readily acknowledged that there were others, both at their facility and within the

marine mammal profession, with more knowledge and experience from whom they

could always learn more.

In the interactions, the trainers learned from one another, from the dolphins, and

from the visitors. Their role put them in the spotlight, not only during the interactions

but also when they were recognized when walking through the facility and out in the

community. Consequently, they were highly motivated to be seen as knowledgeable

and skilled. One trainer summarized the attitudes that many trainers had expressed

about their ongoing learning of dolphin training and management skills in these words:

> I think with most trainers, with this type of job, it is shifting your focus on what are you reinforcing, and what do you want to place your emphasis on. I think a lot of us lean toward being perfectionists, of always looking for, "How can we do our job better? How can we relate better with our animals? How can I be a better trainer? How can I improve my timing? How can I make my sessions with my dolphin more fun and more engaging for my dolphin?" So I don't think any of us are ever at point where we say, "Oh we know everything," and just go, "I know how to do my job every day." It's always changing.

The ever-changing nature of the trainers' job necessitated ongoing learning in

multiple domains.

Knowledge

As one might expect, the trainers did not talk about learning a lot of new

information about dolphin physiology and natural history through the interactions. It

was a fair assumption that the trainers were trained initially and thus already quite

knowledgeable about dolphins. However, through preparing for delivering the content

and engaging in teaching dolphin information, as well as through interacting with

experts in various specialties, some of whom they met in the sessions, the trainers

continued to learn new information.

Information about Dolphins

The trainers had clear memories of the times that they learned new content information from visitors in the interactions. For example, one trainer said:

> I like when you get people who have a specialty that maybe kind of overlaps with what you do but not completely, [such as] a specific type of doctor and I can learn more about how dolphin physiology compares to human physiology.

Another trainer talked specifically about learning about the dolphin eye during an interaction session from talking to one of the visitors, an ophthalmologist who was in town to attend a medical conference:

> There was an ophthalmologist. Some things that I look at, but don't notice… I've looked at the dolphins' pupils so many times and never noticed that they were hour-glass in shape. And so I walked away from that program having learned that about our dolphins.

A different trainer talked about her interest in learning new information and also that she had a sense of responsibility to answer visitors' questions accurately:

> The other group was talking about if the dolphin had a blood type and I didn't know the answer. But I remembered that [the veterinarian] had sent an e-mail to us about what kind of blood type they have and …I was able to find that file...and then we talked about it after the program. If [the visitors] hadn't asked me that question, I probably wouldn't have read the paper….We make sure we find someone who can answer [tough questions]….

None of the trainers had formal teacher training before their current jobs, so they had learned the content and how to use multiple teaching methods in order to teach others in the interaction sessions. Most of the trainers talked about the process of teaching a wide variety of information about dolphins to the visitors. For example, when in the water, they talked about dolphin anatomy while also directing an animal

to position its body in ways that would allow the visitors to see the different body parts. One said, "We teach them about their anatomy. They learn that dolphins actually have ears and they learn how dolphins receive sound. They learn how dolphins communicate with one another." A different trainer explained a video clip: "[The visitor] was able to be in the water and then put her mask on and hear the echolocation and watch how [dolphin name] retrieved toys and everything under the water [while wearing cups that covered the eyes].

Another trainer recounted, "Also with the coloration differences, I was talking about that too. It was kind of like a camouflage for the ocean, in general, trying to see darker on the dorsal and lighter on the ventral side." A different trainer recalled, "I was having [the visitor] rub [the dolphin] on the back because one of the guests had a question about the rake marks[38] on her back and so I had them touch the rake marks."

Some trainers said they taught about dolphin vocalization, such as:

We're doing vocals. This is where [the visitors] can see how they maneuver their blowhole; because everyone always thinks that the vocals come from their mouth. I have [the visitors] squeezed together to do vocals and they can see her manipulate the muscular flap.

Trainers also talked about setting up scenarios for the visitors to have a variety of sensory learning experiences. One commented, "I'll go to a breathing demonstration [and] have them feel the air coming out of the blowhole." Another trainer described a teaching vignette: "This is the [visitors'] chance to use masks and

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[38] Rake marks are superficial scratches on a dolphin's skin caused by another dolphin's teeth during normal social activity. Rake marks typically heal without noticeable scarring within a week or two.

look at them under the water…the dolphins are underneath them. People love that and

say, "Wow, they're going right underneath me, which is so cool."

Trainers said that the interactions enabled people to see things and have

experiences that were not available to them in any other format. For example:

> One thing I love to talk about is the ears just because they're so small. It's something that [people] can only see when they're actually face-to-face with the dolphin. It's not something you can see from the shore and the ocean.

While all the trainers said that the interactions provided many learning

opportunities for participants, about a third of them had learned that a high

level of interest in dolphins did not necessarily correlate with a high level of

knowledge about them. For example, a new trainer said:

> I was amazed at how little the public knew. Occasionally, there [is] a guest who…knows more about dolphins than I do; but, in general… just talking about the dolphin's body parts and what they do and how individual dolphins can be, I see a lot of people who are just amazed. They have more and more questions to ask because they had no idea that dolphins could be so complicated.

A trainer with over four years of experience said:

> There's a potential for a lot of learning…I think that there's a lot about dolphins that the [visitors] have no idea. I mean you would ask them if they are fish or mammals and most people get in the water thinking that they are fish and they have gills. A lot of people do not know facts about dolphins at all, so I think that they see this and they're like, "Oh wow. That'll be really cool. I've always wanted to do this. It's a once-in-a-lifetime opportunity." Then they get in a program and there is so much that they can learn because they really don't have a background.

One trainer gave a specific example of a visitor's lack of knowledge:

> One guy was amazed that they weren't slimy. And I said, "Well that's because this is skin just like ours with very, very tight pores. So it's

smooth, but they are not like fish with scales or exuding any kind of mucous of anything like that or any type of protective coating." He was like, "[It] never occurred to me, I thought they were so shiny that it was some kind of slime."

On the other hand, two trainers remarked that some visitors do have a strong bank of knowledge. One said, "[There are] kids that come and know so much more at eleven about dolphins than I did four years ago when I started at the company because they read every single book that's available to them." The other said, "A lot of people do come with lots of animal information."

Three trainers said that, not only did they want visitors to learn factual information about dolphins, but also they wanted them to gain an appreciation and respect for the *real* dolphin. I asked them what they meant by real, and one replied:

> I mean they have motivations as well as likes and dislikes. I don't think a lot of people think about that kind of stuff. And they have baby dolphins; they mate. I think when they realize that stuff it's like a light clicks on in their head like, "Oh my gosh! Wow!"…They can realize, "Wow, these are actually animals that exist on their own without us there…"

Another trainer said that she wanted to give visitors a realistic sense of a dolphin in contrast to an idealized portrayal:

> I think [the interactions are] such great opportunities to teach people about [real dolphins]…I try not to give this sugarcoated version of them to the guest, and when the animals don't cooperate, when they don't gate[39], when they don't want to participate, I don't cover that up to the guests.

A different trainer reflected upon the individuality of each dolphin:

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[39] *Gating* is the term used to mean that the dolphins go through a gate from one enclosure to another when directed by the trainers. Dolphins in the three research sites are routinely directed to move between areas of their habitats several times throughout each day for purposes of social grouping, training sessions, medical exams, and to participate in interaction sessions with visitors.

> I think working with the dolphins as a trainer, you have a more holistic view of the [dolphins]. I think a lot of times people have that Flipper[40] image of dolphins as always happy and perfect. But as a trainer, it's interesting, you get to study the animal and their behaviors and then you know they're not perfect. [You are] working with their own individual backgrounds and histories and building that relationship with them, and seeing what progress you can make. And if they were perfect, our jobs would be really boring. That's part of the fun. It's different every day.

Most trainers made comments about the ever-changing nature of their jobs as dolphin trainers in the interaction activity, and they regarded the variations to be opportunities to learn more about content, the visitors, and the dolphins.

Information about Zoological Activities

According to the animal management directors at the research sites, trainers had to be proficient with the fundamentals of animal training methods before they were eligible to lead interaction sessions (Director of Marine Animals at Lagoon and Cove, personal communication, August 2008; Supervisor Animal Training at Bayside, personal communication, October 2008). In their daily operations and continuously during the interaction sessions, trainers practiced their training techniques and learned new ways of working with the dolphins in their zoological settings. A few trainers talked about how complex their learning is, as articulated by this trainer:

> I had no idea how complex dolphin training was or any other training for that matter. Before I had gotten involved in this field, I just was the typical person thinking, "You get in there, you ask them to do something and they get a fish." There's so much that people just don't

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[40] Flipper was an American TV show in the 1960s that featured a dolphin named Flipper as the companion of a family living in southern Florida. Flipper, portrayed as extremely intelligent, helped to enforce regulations in the marine reserve, rescued people at sea, and played with the children.

realize and I try to tell that to my guests too. My biggest pet peeve is when my family says, "Oh, you're going to go play with dolphins today, you're not working." I'm like, "Seriously I am working!" There's so much that's going on in our heads. We might have four dolphins out there, 24 people, four trainers, and all the production staff; and we have to make sure that every single one of those dolphins is where they need to be, where they are supposed to be at every single second of the program. And that's a lot. There's a lot going through your head and at the same time keeping your peripherals covered… being right there in the middle of your guests, and making sure that you are fully there and yet [watching on the periphery at all times]. I had no idea, when I think back to going to places like [site]; it was beyond my thinking. I just had no idea but it's awesome, I love it.

Just as most of the trainers had talked about learning different ways to present information to the visitors, they also talked about constantly learning new ways to infuse their public interaction sessions with a variety of experiences related to the training and care of dolphins, such as shown in this trainer's commentary as she watched the video of her session:

I'm showing them the vein on the tail fluke where we collect blood samples and they're just asking questions. And we're feeling the skin and I'm thinking I wanted to connect the medical talk because I had said when we stepped into the water, "I want to show you where their veins are." Here I'm thinking, "Oh, well, we've done a lot of low-key behaviors, so I'd like to show them a big jump."

Because both the visitors' behaviors and the dolphins' reactions to them were spontaneous factors in the interactions, the trainers had to adjust their training approaches and information delivery throughout the sessions, thereby constantly learning which tactics worked best. To illustrate this point, one trainer explained:

If the guests are flailing around, the dolphins are not going to really come close to them. Maybe we'll do a wave behavior so they're still getting that [interactive] experience while I try and work on the people to keep their feet down.

Another remarked about providing reinforcement to the dolphins:

[The visitors] were [rubbing] all over the face, so I'm thinking about [the dolphin's] behavior. He's tolerating it, which is great, but I don't want to keep putting him into this group with people rubbing his eyes and stuff. So I'm making sure I'm reinforcing him. He's doing a great job with me. He's staying with me.

Two thirds of the trainers explicitly commented about learning from the animals during the interaction sessions. For example, one trainer explained, "If you are watching your animal closely, you can really learn what they get excited about and what they find aversive." A different trainer said:

We're always learning from the animals, too. Absolutely, every day can be different. And what's fun as a trainer, the whole time you're talking with your guests, they don't always realize all the training that we're still doing. We're training the entire time we're in the water interacting with those animals.

The trainers were enthusiastic proponents of positive reinforcement training techniques and they liked to talk to visitors about and demonstrate them. One senior trainer said:

Positive reinforcement is, I would think, the biggest [thing that people can learn]. It's not really a hard concept to grasp and we've seen such great results with our animals. It's really great to show it [rather] than to showcase [the behaviors only]….a lot of my guests ask, "How do you get them to do this and this?" It is the positive reinforcement; but patience as well. I found myself saying a lot of times that these guys have really taught me patience. [Their behaviors] are purely voluntary so it really teaches you to just relax, calm down, nothing has to be immediate. It will take its time, but if it's meant to be, it's meant to be. It's just we can't force anything to happen with these guys.

Several of the trainers said it was important for visitors to understand the voluntary nature of the dolphins' cooperative behaviors. One trainer told of a time that

a visitor accused the trainers of tricking the dolphins into doing behaviors. She

explained to me that:

> I don't want [visitors] to go away with false information…that it's not
> really voluntary, that we actually do trick these animals to
> participating, because I feel so strongly about the voluntary basis that
> we only do things according to the dolphins, really.

A different trainer said that she believed that once people became aware of the

voluntary nature of dolphin training, they became more tolerant of variations of the

dolphins' behaviors in the interactions:

> I started out saying we have all voluntary programs here. We never
> force the dolphins to participate if they don't want to. [They want to]
> most of the time. They're like, "Oh! Perfect! We'd much rather have
> a dolphin that is motivated and wants to be here." So when we have
> to step back, and when I can say we know these animals really well,
> we know their behavior, and this behavior is showing us that maybe
> the [animal's] motivation is not there, we'll let him do whatever he
> wants and we'll bring out a dolphin that wants to hang out, [the
> visitors] are usually very understanding.

Teaching others the principles and methods of animal training can be a good

way to reinforce one's own learning and the trainers often encouraged the visitors to

try training techniques and behavior signals. For example, one trainer said:

> My favorite program is one or two people in the water because you
> can do so much. You can explain to them exactly the steps of
> training. You can have them act as the trainer. You can have them ask
> for behaviors. You can have them do a training session.

Different trainers talked about various ways they involved visitors in animal-

training methods, such as, "That's one of the things that I really like to do as a trainer

in interactions is to ask the guests to send the signals so that they feel more a part of

doing the interaction." Another said, "I was explaining to the [visitors] how they are going to help me reinforce and tell the dolphins, Good job!"

In addition to teaching visitors to use common training signals, one trainer described how she involved visitors in training a new dolphin-enrichment activity:

> I brought in some props and I explained to the [visitors] that we're training these guys to recognize shapes. Eventually we will be able to have multiple shapes around the lagoon and the [dolphins] will be able to go up to their own individual shape. So, I had the [visitors] actively involved in the training because it's not even finished yet. It's always cool to get them involved so that if they get that monthly [newsletter], and they get an update on the shapes, they'll go, "Wow, we were there, we helped with that."

Building upon basic dolphin training methods, the trainers learned, practiced, and taught about husbandry practices and medical behaviors. One trainer described teaching about this topic as she watched the video:

> Here I'm teaching them about her flukes and showing them the veins on them, and I'm telling them about when we get a blood [sample] from the dolphin to see if they are sick or, if they have any health complications, the vets will get [blood samples] from there.

Because the interaction sessions are not scripted, trainers had to learn to be prepared for unexpected events. One trainer told about such an experience:

> I'm explaining the blood behavior…and [dolphin name] started to poop. That's really funny. I'm just explaining the medical care that these guys get, and that it's is far greater than our own health care plan and a lot of people don't realize that.

Another trainer said that:

> Some people [say], "Oh my gosh, it's gross." But yes, I love to throw in the medical [behavior information]. Really what amazes me [is that], in just explaining how the [dolphins] will lay there for the blood draw, [it] gets the [visitors] involved; and [they can] actually roll [the dolphin] over to take a breath and be actively involved in that.

Almost all of the trainers talked about having learned about the good quality of care of the dolphins at their facilities. For example, one trainer said:

> From working here, [I've learned about] the quality of care that we give our dolphins. It has made me have a greater appreciation for facilities that do take great care of their animals as well. I share with my guests [so that they can] educate themselves, too. If they do want to interact with any kind of animal that is in human care, to research the company because you don't want to support, inadvertently support, companies that aren't taking good care of their animals.

Through repeated interactive sessions over time, the trainers reinforced their own knowledge and skills with husbandry and medical behaviors by practicing and demonstrating them to others, and by observing and being instructed by more knowledgeable others, such as the veterinarians.

Information about Conservation

Most of the trainers said they had become more aware of conservation issues that affect dolphins since working at their facilities, as exemplified in this trainer's comment, "I am a lot more conservation-minded now that I used to be. Little things I never thought about until working here, like how much we can [do] recycling and just like the conservation efforts at home**."** Another talked about the dolphins as a tangible reason for engaging in stewardship behaviors:

> The [dolphins] definitely inspire me to, "Okay, I'll think a little bit more about that," and really, you have a face to what you're doing things for…like bringing reusable bags to the grocery stores and…then once you start doing it you're like, "Okay, this is so easy to do," and it's a small change that can make a big change, really.

Just as the trainers needed to learn information about dolphin physiology and

natural history in order to teach others, they also had to learn information about numerous conservation topics relevant to dolphins. Fifteen of the trainers talked about including conservation information in their sessions. For example, one trainer said:

> We do try to do a conservation talk. And it's nice. It's not something that's formalized where there's a script that we follow. But there's plenty of information and the trainers kind of pick and choose what we use with each session, with each guest, and try to tailor it more to get a read off our group and see what their interests are.

Another trainer said, "We always talk about conservation. That's one goal of ours to always talk about conservation and what [visitors] can do to help the environment." In contrast, a different trainer cautioned against using a "preaching" method of teaching about conservation issues and actions in her interactions:

> There are times where we can interweave [conservation information] where it just comes up like, "That's where you can also help us out, just through conservation, through recycling."… I'd like to think that we pass along messages of conservation and turn it around to the guests and ask, "What do you feel that you do every single day?" So we're not just kind of preaching what we do but [we have the visitors] give us suggestions because we can all be better. It's not just a matter of, "you do this and you do that". This is how we can make it better.

Still another trainer's reflections upon the interaction sessions suggested that she thought the sessions would benefit from greater emphasis on conservation:

> I feel what we do as far as our private [contribution to] conservation is that we create really positive association with the animals and hopefully that leads the [visitors] to make changes in their lifestyle to help the animals or donate to good causes. But I would like to see more of a conservation message being placed in the interactions with them. I think that's the one aspect of education that we are lacking a little bit because it is a fun playtime with the dolphins, as opposed to these are the animals that all of us can help.

A few trainers said they occasionally learn "some fun, conservation facts from

our guests," and "we do [get some good stewardship ideas sometimes]. I'm really

impressed with how passionate some guests are." However, more trainers reported

having learned that most visitors had low levels of knowledge about conservation

issues that pertained to dolphins. For example, one trainer said:

> I don't think the [visitors] are aware of all the things that they could do to help save dolphin lives….I don't think they realize that, even if they don't live anywhere by an ocean, their actions could possibly have a negative or a positive effect on [the ocean]....When I ask some questions [about conservation behaviors], I don't get the answers that I expect in programs….I can tailor my conservation message [because] you need to be sensitive when you're educating, and I don't feel like preaching is necessarily a great approach. And so, I like to ask questions to see [what they know]… [Their conservation knowledge is] pretty low.

Two different trainers talked about the lack of visitors' knowledge about U. S.

federal law pertaining to dolphins:

> [The visitors] are not educated. Then you start talking to people about the Marine Mammal Protection Act and stuff and they say, "Oh, I had no idea, no idea that that's not what I'm supposed to be doing." So that's why I think it's great that we're here to pass the message along because so many people don't know.

> [Visitors] just don't know a lot of information about [dolphins]. They consider themselves to be very knowledgeable, they consider themselves to love them and then they don't realize that they just don't [know]. A lot of them say, "Yes, I was trying to feed them in the ocean, I was trying to swim with them." They just are not educated with laws governing them [or] with facts about dolphins.

A couple of trainers acknowledged that they, too, had not known about laws

prohibiting approaching wild dolphins prior to being involved in the interactions. One

said, "Well you know, honestly, way back when, I thought it would be cool to swim

with the dolphins out in the open ocean."

Meanings through Connections

Connecting to Personal Experiences

Some of the trainers talked about their first interactions with dolphins and how those experiences affected them as trainers. For example, one recalled that her first interaction had a strong impact on her commitment to conservation and that she wanted to facilitate that experience for others:

> My top priority is teaching them about the dolphins as a species and also making sure I cover conservation topics because that's honestly why I wanted to work for [site] in the first place. When I knew I wanted to be a dolphin trainer, it was to increase conservation efforts. From my personal experience…I was more mindful of everything I did after I was up close and personal with the dolphins. [Knowing] how huge of an effect it has had on me, I know that I can do the same for others. So I focus on the anatomy stuff, the mammal stuff, what makes the mammal a mammal, and then I try really hard in every break and every program to focus on that conservation talk.

Another trainer said the deep-water portion of the interaction enabled her to share with the visitors her own dreams of what it might be like to snorkel with dolphins in the wild:

> For me, the mask portion is the best part of the program. It's what, when I was a guest, I really wanted to do because my dream was to be out snorkeling and get to see a dolphin or to be out scuba diving and see a dolphin. This is, I think, our chance to share that experience with our guests.

A few of the trainers said that the experience of being a dolphin trainer gave them a privileged point of view, as shown in this trainer's remark:

> There're lots of interesting things, not just that they're mammals and things like that…but things that most people out in the public aren't going to know, whether that's things with their skin and…seeing how well adapted they are for their environment…and also how each dolphin is so different from each other. It's such a cool point of view

that most people don't get. When [visitors] are in [the interaction sessions]…you can open their eyes about how different every animal really is from each other.

Another trainer struggled to articulate how her beliefs and feelings had changed because of her involvement in the interactions:

Before I started working here I thought, "Well, that's pretty cool, dolphin-human interactions. It's a great way for people to not only get to see the animals up close and personal, but maybe make a difference in some way." Now, being in the position where it's my job, but more than that, it's kind of like my duty to try to share that with people. And I think it's more of an emotional connection for me now. I mean, I think I always felt it was an educational opportunity for people and now that I'm doing it, I try to incorporate the educational aspect, but it's deeper than that now, too. I don't know; it's hard to put it into words. It's more of an emotional connection.

Connecting to Familiar Beliefs and Practices

Trainers' comments reflected a number of their beliefs or assumptions about themselves, the visitors, and the dolphins. Just as the visitors and spectators had expressed beliefs that the interactions can establish a connection between the visitors and the dolphins, so too did the trainers. For example, one trainer said:

I think having that physical connection, the touch experience, brings about the emotional connection. It's one thing to sit and look at something and feel like you have a certain amount of emotion for it or about it, but once you actually have that physical connection with it, it makes it more real or more intense.

Another trainer talked about wishing to establish a connection for visitors that resulted in respect for dolphins and pro-environmental action:

[Visitors say], "This was just incredible! I never realized I would have these emotions," or "I just didn't know what to expect." [The interactions establish] those emotional connections for a lot of people.

Some of the guests were hopefully feeling like we're connecting with them in some way so that they want to, in turn, do something to make a difference. Maybe, for some people it is just an emotional connection and meeting a dolphin was the best thing ever, a once-in-a-lifetime thing and that's it right there; but I think just raising their awareness about marine mammals, the impact that we have on their environment, having respect for the animals, it's a privilege for us to be able to do this kind of work. I could go on and on…

Most of the trainers used words such as *respect* and *love* when talking about the dolphins. One trainer explained that working with the animals had elevated her love for the dolphins:

It's made my life different being here. I've always loved not just dolphins but marine life in general. But now that I've come and actually have my animals that I work with and [I know] the individual animals, you realize how much you love them….I don't think you really get to fully understand and respect and appreciate them until you're working with them one-on-one and you can, on a daily basis, see their personality, their social groupings, see them have babies and care for their young, and see their intelligence. And so I think, if anything, [the interactions] just take it to a greater level for me.

Without exception, the trainers all had positive things to say about what they had learned about the quality of care given to the dolphins. This knowledge prompted a couple of trainers to reflect upon how their attitudes regarding animals in zoos had changed:

I do remember thinking that this lagoon seemed small, at first. But after learning about what type of dolphins these are, the kind of environments that they're normally found in out in the open ocean and realizing first-hand how good our dolphins' lives are, not just our dolphins but our animals, in general, of course, that has completely opened my eyes to the kind of quality of life we can provide for animals that we're in charge of.

Another trainer told how she had previously thought of the interactions as a

brief entertaining experience but that her beliefs about the complexity of the

interactions had changed because of her participation as a trainer:

> What did I think about interactions beforehand? I think I thought it was just a fun way for people who love animals to get to have, just for a flash in time, what I have in my lifetime. So I think it was a way for people to experience animals on the level that I get to experience them. And I wanted to share that. I was a very new trainer then and now I'm aware that there's a lot of work behaviorally that goes behind getting these animals in with people who are very naive to animal situations.

Connecting to Conservation

All the trainers talked about the conceptual importance of having an awareness

of conservation and doing stewardship behaviors. Several trainers expressed the view

that interest in dolphins should be accompanied by an attitude of respect for dolphins

and an attitude of stewardship. For example, one trainer said that people who care

about dolphins should be, "protecting them and…respecting their lives and respecting

the ocean." Another trainer said that, along with liking dolphins:

> Being aware of conservation [and] just how much of your everyday life really affects not just dolphins but every marine animal out there [is important]. Also, if [people] have a great affinity for dolphins, [they need to] recognize that, they're not the only animal in our marine world or on our planet, for that matter. [People need to] just make responsible choices.

Almost all of the trainers talked about various everyday stewardship behaviors

that they would expect people to do if they cared about animals, in general, and about

dolphins, in particular. They emphasized the importance of individuals doing specific

stewardship activities and collectively listed multiple examples that included:

(a) "making sure to recycle," (b) "cutting up the six-pack rings," (c) "bringing canvas bags instead of using plastic bags because so many plastic bags end up in the ocean," (d) "turning off the water while they brush their teeth," (e) "not interfering with wild animals," (f) "not littering," (g) "reducing use of plastic and other kinds of rubbish that could be harmful if it ends up in the ocean," (h) "not eating any types of sea food [labeled 'Avoid' on the seafood watch cards that we give out," (i) "watching what goes down in your sewage drain because it goes straight out into the ocean," (j) "carpooling," (k) "being really careful with trash because plastics are the number one pollutants on the ocean," (l) "not littering, especially here in [town name] because we're right on the coast," (m) "being better consumers of more responsible and sustainable [products]," (n) "donating to conservation causes," and (o) "cleaning up after themselves when they go places; when they go to the beach, that old 'leave-it-cleaner-than-you-found-it' attitude."

One trainer commented about the general applicability of stewardship activities beyond ocean-related conservation: "Well, I think all the general conservation [actions] apply for every ecosystem, from recycling, to reducing your carbon dioxide output, car pooling, [and] things like that."

About three quarters of the trainers said that they wanted to influence their guests to take conservation action, as shown in this trainer's comments:

> My goal is to have more of an immediate impact and have them change [behaviors in] their everyday life: [be] more focused on recycling, more focused on conserving energy, more focused on not interfering with wild animals. I think that has a much bigger impact than starting your own dolphin foundation.

A few trainers talked about the challenges involved in changing one's personal behavior. For example, one trainer said:

> I think it would be really hard for any one of us to drop every single bad habit we have and never use it again. I'm still guilty of using Styrofoam occasionally. It's terrible, but it's so hard and so I feel like knowing is the first step; researching and then figuring out how you can best put that into your life. Also passing that message on and not just thinking, "Oh, it will be okay for me, too."

Two trainers expressed somewhat pessimistic opinions about public knowledge and involvement in conservation, as shown in their comments:

> What do I think the average dolphin lover will do [for conservation]? Maybe cut the tabs or the plastics from the soda cans and recycle. I think a lot of dolphin lovers just love dolphins like some people love unicorns. I don't think it extends into a love of the environment. I just don't think people are educated in that enough.

> …you meet people that say that they love animals, they love dolphins, but then you look at their behavior at home and they're not recycling, they're not carpooling, and they're not using recycled bags like they [could]. Human are just so wasteful.…they can say they love [dolphins], but a lot of people don't even know that their main threat is pollution….So there is just a lot that people don't know about them. Honestly, I would say that, yes, okay, it's great they love them, but I wouldn't be surprised when I hear people trying to touch sea turtles and [saying], "We saw dolphins, we we're trying to swim with them." It really wouldn't surprise me.

These comments suggest that these trainers had learned information about people, at least some of the people who participated in the interactions, in contrast to learning skills of how to manage people during the interaction activity. Because the sense of connection between the human-dolphin interactions and conservation had grown stronger for the trainers through their participation, they noticed when visitors did not have a high level of knowledge or apparent commitment to stewardship.

Attitudes and Sense of Personal Agency

Attitudes

Eleven of the 20 trainers commented about having developed new attitudes

that were tied to their new knowledge gained through participating in the interactions

as a trainer. For example, one said:

> I mean, to be totally honest, when I was younger, I had no idea. I didn't know it was not okay to go touch [wild dolphins]. So, being here, yes, it has taught me that and taught me a lot more about the respect for those animals out in the wild and how to live on an everyday basis a little bit greener.

A different trainer recounted having changed her attitude and behavior based

solely on what she had learned as a dolphin trainer in the interactions:

> When I first moved to [state], I went out to swim with wild dolphins, not through a paid program, but in an area where I heard there were lots of dolphins. When the [dolphins] were there, I got out of my kayak and got into the water. Because of what I've learned in my job about the effects that that has on the animals and the law regarding those types of activities, I no longer do that. I haven't done that since and I also advise [my friends] who come to [this town] not to do it. Whereas if I lived here and were not a part of [site], I that might take friends out to do that when they showed up.

Most of the trainers said that, through participating in the interactions, they had

learned that their personal actions can have a positive impact on the environment.

Furthermore, they indicated that they felt a sense of responsibility to model

stewardship behaviors in their personal lives as well as at work.

Agency: Intended Stewardship Behaviors

Most of the trainers also said that their increased awareness had made them

more committed to engaging in personal conservation action. Some talked about

intending to increase their stewardship behaviors:

> I think sometimes it's challenging to change all of your habits, so what I try to do is take on one thing a month. At first, it's like I have to train myself to do it and then it gets to the point where I'm like embarrassed or disgusted if I don't do it.

Only one trainer disclosed that she did not yet practice conservation:

> I think about [conservation] a lot, but I have not acted upon it. I've looked it up on the internet actually about two months ago. I was looking up conservation agencies, or clubs, or groups that work to help educate the public about the environment and how you can help [locally]…I just haven't joined and I haven't volunteered, yet.

Another trainer commented that, although her conservation habits were

established before she began her trainer job three and a half years earlier, her

experiences in the human-dolphin interactions were inspiring her to consider a

different level of conservation action:

> After being here for a while, I know I would like to go back to school and do conservation work for marine mammals. That was also a goal when I was growing up: either doing research with dolphins or doing work with them in a facility. So, being here, seeing the public, and seeing how people interact with the animals and the awareness that this creates, it does motivate me to want to go out and [do that work].

Agency: Reported Stewardship Behaviors

Most of the trainers gave lengthy accounts of the conservation activities that

the human-dolphin interactions have inspired them to do. Examples of their reported

stewardship behaviors included these excerpts: (a) "When I go to the grocery store

now I put my reusable bags in the car, take them with me and try to remember to put

them back in the car once I unload the groceries;" (b) "reusing plastic bags;" (c) "avoiding any use of the Styrofoam or plastic in the cafeteria;" (d) "carpooling;" (e) "recycling;" (f) "the interactions have inspired me to ride my bike to work; I'm not that far away, so I should be practicing what I am preaching;" (g) "making donations to different organizations;" (h) "using the seafood watch guide where I know what fish are sustainable…I'm not going to eat [a certain] one because it's not sustainable;" (i) "I'm always talking about the Marine Mammal Protection Act, Endangered Species Act, all that kind of stuff [outside of work];" (j) "There is no way I'm going to let the water run when I'm just brushing [my teeth] or showering;" and (k), one trainer said that when leading the interactions, she is, "commending my guests for doing good things on their own at home so it makes me more aware of trying to bring Tupperware containers to take-out places if I am going to go eat so I'm not using Styrofoam."

For half of the trainers, it was not just their participation in the human-dolphin interactions but their position as a trainer in the interactions that had caused them to increase their stewardship activities. These trainers gave detailed testimonials about the changes that their position had inspired. For example, one trainer compared her current attitude and activities to those in her childhood and adolescence:

> Gosh, my conservation efforts have, I would say tripled, quadrupled, especially [compared to] where I grew up where there's really not that much known about recycling or conservation efforts. I mean I grew up very wasteful, when I look back, just throwing away everything and never really knowing about recycling. Even moving out here when I first started [the job], my conservation efforts were not that great. It was like, "Oh, yes, there's recycling." But I see myself now and over the past year searching for recycling bins and saying, "No, I'm not throwing that away," or "I'm not buying that," and passing on [the message] to my friends and my roommates. Even

when I traveled back home for a vacation, we were walking on the beach at Lake Michigan and I saw all this trash so I just started picking it up and my family looked at me like I was crazy. They're like, "What are you doing?" But I just thought, "Well, why not? I mean, I'm walking down this beach and there's so much of it, why not pick it up?"

Another trainer commented on practicing what she preached in her job:

When I lived in Southern California, recycling was really easy. It was picked up and not a challenge at all. The same is not true here. It takes a different level of active participation. You have to bring it to the reclaim center, and the sorting is stricter and I think, because of what I do, I'm more motivated to make sure that I continue my recycling. I just switched to canvas bags for grocery shopping and I don't know that that's a change that I would've made if I didn't tell guests to do that every day. You can't impart those messages and not do them yourself without feeling like a horrible hypocrite.

In addition to everyday actions and modifying personal behavior, one trainer told of her new-found community involvement and thirst for more knowledge:

So [I've] really thrown myself into volunteer work outside of [work] and I'm always bugging [the supervisor] about other opportunities that may be out there. I was a site leader for the whale watching and I volunteered for eight weeks to drive up to the North Shore to watch monk seal pups. I really enjoyed learning more about the animal, the marine community in itself. So I think the inspiration [has been] to just learn more, get out there and educate yourself not only on dolphins but all marine animals. Because the question is going to come up in your job and I want to have enough information not only for myself but to pass on to guests as well, that it's not just about these [dolphins at the site]. There's so much more out in the ocean.

As a group, the trainers said they were very committed to conservation by "taking those baby steps towards living a better life." Although confirmation of the trainers' reports of their personal conservation activities was beyond the scope of this study, their detailed and reflective accounts of their various stewardship practices suggest that they were giving truthful and accurate information. Their reflective and

detailed comments also suggest that, because of what they had learned in their job and the role they played in the interactions, they felt a responsibility to model stewardship action both at work and in their personal lives outside of work.

Skills

Dolphin Etiquette Skills

When learning to be a trainer in the interaction activity, the trainers had learned specific ways to approach and touch the dolphins in order to put them at ease, and they had learned how to recognize and deal with precursors to potential aggression (Ramirez, 1999). In the interviews, they talked about using this knowledge to teach the visitors how to approach and touch the dolphins during the interactions. One trainer commented, "Most of the people are very receptive to any coaching we give them about where we prefer them to touch the dolphin and most people are very respectful."

Dolphin Management Skills

All the trainers talked extensively about learning new skills of training and managing the dolphins on an on-going basis. One trainer explained, "Every interaction we have with the dolphin, whether you're on the dock interacting or you're in the water with the dolphin, you're always training. A critical part of training is your timing and what behaviors you are reinforcing." Another trainer gave a more technical description:

> As a trainer, we are reinforcing everything out there. We're looking
> for criteria. We're looking for a certain behavior so whether it is even

a heads-up[41], there is certain criteria that we're looking for before we'd actually add primary and secondary reinforcement to it. …We're conditioning nice, calm, baseline behavior with everything that we do and even if we point away and an animal just touches our body when they're leaving, 'could be our fault even because we pointed and we were too close to them, we will communicate to the other trainers, "Don't reinforce that for three seconds." Because that little touch, if reinforced over and over again, could inadvertently reinforce a bigger touch.

When talking about dolphins learning, the trainers talked almost exclusively about behavioral conditioning, rather than the dolphins' intelligence. In fact, only two trainers mentioned intelligence, in contrast to 75% of the visitors and spectators. The idea of dolphins' as highly intelligent animals is a pervasive view in American culture, and it is promoted, usually without discussion, in popular print and electronic media, including in children's books.

All the trainers emphasized that the well-being of the dolphins was their top priority, as illustrated in this excerpt from an interview:

Our animals [are] always at the forefront in our consideration, from the behaviors which we choose, or if we have guests who maybe aren't as respectful as they should be with the dolphin then I alter what behaviors I ask for. Sometimes guests, no matter how many times you've explained it, they want to touch the face or maybe they're heavy petters, so I'll try to get my dolphin in a better position so they can't do that to him.

The trainers said that if there was something going on in or near the dolphins' habitat that could distract or upset the dolphins, the trainers did their best to compensate for it. For example, during data collection at one of the sites, a

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[41] "Heads up" refers to a behavior where a dolphin moves close to where a trainer is located, positions itself vertically at the surface, holds its head above the water, and looks at the trainer.

construction crew began noisy jack hammer work nearby. One trainer explained how this noise affected the dolphins:

> Well, just before the session, obviously, we had a challenge as far as jack hammering going on in the lagoons around us and a new sound, so it was something that our animals were sensitized to. We knew this because they weren't showing baseline behavior. We want to see baseline behavior with our animals before we'd ever bring guests in the water. Baseline is going to be different from each individual animal but it's the norm for that particular animal. For instance, [dolphin name], our oldest dolphin out there, 17 years old, his baseline behavior would be swimming slowly, a lot of times by himself, upside down, sometimes biting on water or looking at the guppies. [Another dolphin's name] baseline is that he's with other animals; he likes to be tight in the group. But he's always looking for us too, so it's very baseline for him to be right there by the docks, looking about, looking for what we're going to be doing next…. During the jack hammering, we didn't see that. [The dolphins] were all together really tight, not as interested in what we were doing, didn't want to go to certain parts of the lagoon that were maybe a little closer to the noise. So as part of our job, it's the safety of our programs that are so important. That's why we want to see baseline behavior before we'd ever invite our guest in the water with us….We want to be conservative in our approach.

At a different site, a trainer recounted how she thought to manage a distracted dolphin: "I could tell that [dolphin name] was a little distracted so I tried to stay with some easy behaviors that wouldn't require a lot of her focus in terms of contact, holding, and all that."

All the trainers said that they were constantly learning new things about the individual dolphins' temperament, reactions, and "the dolphins' likes and dislikes." For example, one trainer said, "We can learn when a certain animal might be uncomfortable with a certain guest." Similarly, another trainer explained how the trainers might handle such a situation: "[We can learn] about the dolphins. If for some reason the dolphins are

sensitized to a person wearing shoes or [a garment with] flowing [fabric], we can work

with that animal and the guest and slowly do the small approximations of

desensitization."

Learning how to "read the dolphins" appeared to be an important skill because

of the unrehearsed nature of the interaction sessions. As one trainer said, "The

[interaction sessions] are not scripted in any way." Another commented:

> I think that's something that's really changed for me, it's not just
> coming in and do a behavior, feed the dolphin, do behavior, touch
> the dolphin. To me, I think the interactions are come in and meet the
> animal and see what the animal is. It's not like a set up, rigid
> structuring.

Another trainer remarked, "[We] become more and more adept at our dolphin-

reading skills and [we] learn to really think on our feet and quickly react to any type of

situation." A situation variable could involve other dolphins in the interaction area

because, "You know, you can't all be sending signals down at the same time. There

are behaviors that you may want to include in [your session] but you have to see what

the other trainers are doing." A different trainer commented:

> I am looking at everybody all the time, not just what's happening
> [with me] because what's happening with the other dolphins affects
> [the dolphin she's working with]. If I know what's going on with the
> other dolphins then it's clear to me why [the dolphin she's working
> with] is refusing to do something.

All the trainers mentioned that they considered learning dolphin training and

management skills to be an ongoing and integral part of their jobs in the interactions.

As one trainer with five years of experience said:

> Oh, yes, [I'm still learning] because I haven't trained every behavior.
> I can learn from watching a session, a training session, how certain

trainers will train a back dive, or a belly breach, or a V-spin. I can learn from them because it isn't black and white. In training, there's a lot of gray area. There're a lot of different ways you can train one behavior and different trainers have different approaches to how they're going to do it. They also change it around for the animal's learning level too because they all have different learning levels, just like people. So how I'd step down and train a belly breach on [dolphin name] will be different from how I train it on [dolphin name], and I can learn from other people about how they do it.

The dolphins' behaviors in the unscripted interaction activities provided continual opportunities for the trainers to learn new training skills and refine and practice established ones.

Visitor Management Skill

In addition to learning dolphin management skills from the dolphins and the other trainers, visitor management techniques were key skills that the trainers reported learning. For example, one trainer said, "Everyday, I learn something new about how certain people interact with the dolphins." Another said she was constantly learning about "People. Everything is out of the ordinary because they all react differently." A third trainer remarked, "I learn on a regular basis not to assume things about people and not to judge what their interest level is or their knowledge level by appearance."

Some of the things trainers said they learned included: (a) "communication skills," (b) "what works…how the best way is to approach something," (c) "reading your guests," (d) "how to tailor the behaviors… or what you're explaining," and (e) to "figure out what they seem to be enjoying more and do more of that." One trainer

commented, "It's a lot more complicated with people, it seems sometimes, than it is with the dolphins."

During the interaction sessions, the trainers had a lot to manage. For example, while watching one two-minute video segment of her interaction session, one less-experienced trainer mentioned eight aspects of the interaction that she described as "tricky" to manage: (a) "such a low tide;" (b) "two groups" in one small space;" (c) "with the angle of the sun, the photographer's best shot is over here;" (d) "all of your guests kind of floating around;" (e) [one visitor's] "eyes were burning the whole time. I felt so bad;" (f) "trying to manage getting everybody together;" (g) "getting the whole group of dolphins right there;" and (h) "not [doing] too many kisses in a row just because I don't want the [dolphins] to be sitting for a very long [time]."

A veteran trainer of nine years remarked that she had learned a great deal about visitor management over the years:

> The thing that I've learned over the years is how to make interactions run smoothly, how to set the people up to do behavior interactions with the dolphins well enough for it to be a positive experience for the person and the dolphin. I think, when you first start, that's definitely a skill you have to learn. And [you have to] learn what your animals find reinforcing from guests versus what they find [to be] aversive from them. And I think you do [it] over time. You really learn [to gauge] what people are looking for when they come in for an interaction: if they're looking to learn about the animals or if they just want to do a photo shoot with them. You kind of learn how to read your guests and tailor your interactions to their specific interests.

Some of the trainers also talked about learning to work with non-English speaking visitors. For example, one said, "My Japanese is improving, but I only know the minimum words." Another said she worked with a non-English speaking visitor in

a different manner: "One of the guests didn't speak English, but his girlfriend did and she would have to translate every time. So I spoke slower and let her translate before I would start it again." While we watched the video of one interaction, a different trainer described how she tackled the language barrier by altering her activities:

> In this part of the program you can actually split them up into groups and do individual things. However, I knew that the Japanese people probably wouldn't understand what I was saying….So, I figured just do it in a group. A group behavior was going to be the most successful for them and for [dolphin name].

A few trainers commented about learning to be sensitive to differences in the culture of international visitors. For example, one trainer demonstrated a hand gesture and confided, "We learn not to do this kind of hand signal with Japanese [guests]…"

The trainers' comments also indicated that they had learned to be sensitive towards visitors who might be apprehensive about the interactions. One trainer recounted, "A lot of the times I meet guests who ask me, 'Will you stand by me, right, right? You'll be right here, right?'…I think it's comforting to know that we [have] the relationship with the [dolphins]."

A different trainer told about one of the strategies she had learned to do with hesitant visitors in the interactions: "For instance, if you have somebody a little bit more timid, having other people start [an activity] first, for an example....If you have someone else starting out, [the timid person my think], "Okay, I can do that."

One trainer said she learned by watching the visitors:

> …their body language, particularly if you had a guest who maybe is really a little apprehensive about coming in and doing this. I think we're really good in making them feel confident and pretty soon, after

a few minutes in the program, they're in there touching and doing everything else with huge smiles on their faces.

A few of the trainers talked about their facility's practice of conducting post-session critiques, including critiques of video recordings of sessions, to review the dolphins' behaviors, their impressions of the visitors' experiences, and their own presentation techniques. The trainers indicated that they enjoyed and learned from this practice. One trainer reflected, "You always walk away from the program learning something that you probably won't try again or you wish that you haven't tried more than once. You're just always learning from it."

The trainers talked about having learned various strategies for managing the photo shoots that occurred in every interaction session. Some examples include: (a) I try to always make sure that if people come together they have a picture together;" (b) "I like to get them soaking wet after they do their hugs. That way their hair doesn't get ruined [for the photos];" (c) If they want to get some fun pictures for their Christmas cards, you definitely want to set that up. However, there is a limit to that. We're going to do what we can but based on the animal behavior;" and (d) "Now I'm just trying not to be in the picture."

While watching a video segment of her interaction, one trainer gave a detailed description of some of their photo-management techniques:

> Here my main concern is keeping everyone involved while, at the same time, taking pictures. We're asked to work really hard to make sure that our photo portion of our program is not a photo shoot and it's not one person after another, while still being efficient with time and bringing each person up and giving them some individual time, like this woman is right now. How to make sure that those four people aren't just left chatting on their own, that they're still getting

every moment of their experience and not just waiting while somebody else does things. So in this case, I'm kind of giving them more of my perspective on it. You [visitors] are not doing a cutesy behavior with him but you're acting as his trainers. You're sending him from one place to another and he is as in tune to you, almost as in tune to you, as he is to me. In other words, it's not just because it's me that he'll respond to the signals, but he'll respond to signals from anyone who gives them to him.

In my field notes, I wrote that the trainers and photographers moved with

"impressive synchrony" to set up the photos of every visitor, while "being mindful of

the background and timing." This type of orchestrated activity was clearly a learned

skill, one of the many social skills that trainers learned through their participation in

the human-dolphin interactions.

Finally, although several trainers made comments about safety, such as "I'm

always keeping vigilant for guest and animal safety;" only one trainer mentioned

having learned safety skills. She said, "Our role is incredibly important for the safety

of the dolphins and the people…I've been through a lot of training when it comes to

safety and programs."

Clearly, the trainers learned and practiced many skills in order to fulfill their

numerous responsibilities in the human-dolphin interaction activities. These included

(a) supervising human and animal safety; (b) maintaining consistency in training

protocols and providing mental stimulation and enrichment for the dolphins; (c)

facilitating an interesting, informative, and enjoyable experience for the visitors; (d)

delivering content information; (e) orchestrating the taking of good quality

photographs; and (f) taking care that all visitors got equal opportunities to interact with

the dolphins. Even the newer trainers demonstrated mastery of these skills as they conducted multiple interaction sessions each day.

Chapter Summary

This chapter has shown evidence of the variety and abundance of trainer learning. Even veteran trainers considered themselves to be continually learning in the interactions. Despite their role as experts in the CoP, the trainers' content knowledge about dolphins, zoological activities, and conservation continued to grow through interacting with visitors and colleagues, and also they learned to deconstruct their personal knowledge into "a less polished and finished form" (Ball, 2000) in order to teach to the visitors' diverse levels of understanding. Through the process of teaching, the trainers learned more themselves.

In addition to teaching skills, they also learned dolphin training and management skills, people management skills, and safety skills. The participants in this category were very reflective about their experiences. In their interviews, they spoke about how the practice of leading unscripted human-dolphin interactions on a daily basis resulted in their own constant and multifaceted learning.

The preceding three chapters reported the findings related to *what* the different types of participants learned in this study. Each chapter also described the means by which each category of participant learned, the *how* they learned. The next chapter discusses the specific factors of the context that mediated the participants' learning.

IX. LEARNING IN THE HUMAN-DOLPHIN INTERACTIONS:

POTENTIAL MEDIATING FACTORS

This chapter shifts the focus to the activity itself, beyond the three categories of participants, the means by which they learned, and what they learned. It identifies some of the distinctive features of the human-dolphin interactions in the research settings that may have helped to mediate the learning. It examines the relations between individuals, the physical environment, and the social nature of the Community of Practice (CoP) that supported the learning.

Learning is a socially-mediated process in which individuals construct meaning through interacting with signs, artifacts, and tools (Vygotsky, 1978). There were many potential mediating factors within the physical, social, and personal contexts of the participants' experiences within the human-dolphin interaction. Although being present at the physical settings for the interaction activity was a common experience for the visitors, spectators, and trainers, the three types of participants experienced the physical setting differently. The participants' roles in the CoP affected their access and interactions in the social realm. In addition, the personal interests, experiences, knowledge, motivations, and affective responses of each participant were factors that influenced their learning.

This chapter also discusses theoretical and practical implications of this research in relation to future work in designed settings and K-12 schools.

This chapter begins with a discussion of some of the cultural and historical aspects of life in contemporary America that were embedded in the activity, even though participants were probably largely unaware of these factors while actively engaged in the activity. Figure 9.1 shows a graphical representation of the nested, and therefore inseparable, influences on the participants.

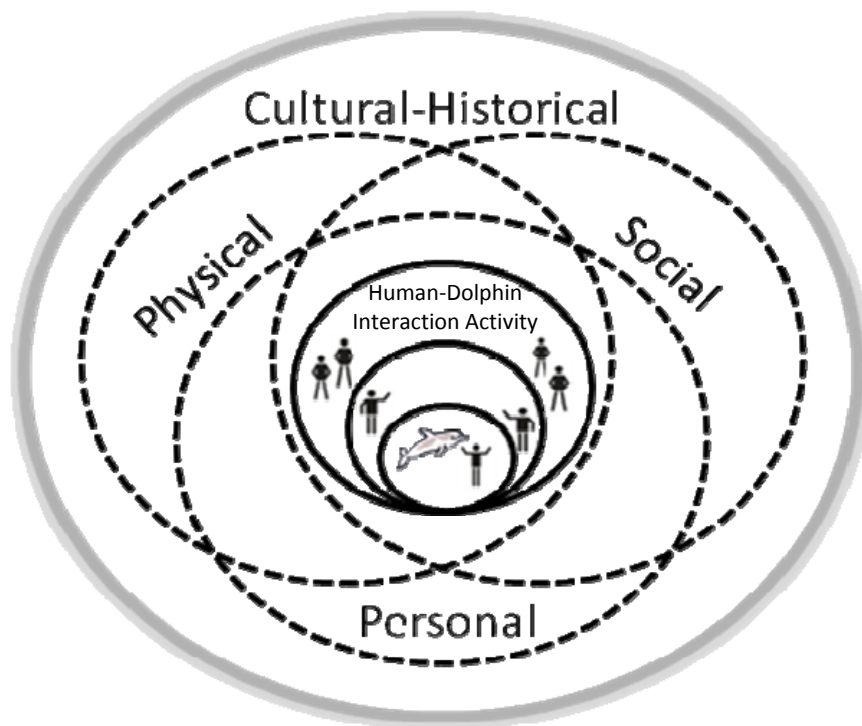Figure 9.1. The personal, physical, social, and factors that affected participants' experiences in the human-dolphin interactions were also embedded in and influenced by the cultural-historical context of contemporary American society.

Representations and Expectations

The human-dolphin interaction activities exist within the broad cultural milieu of contemporary American society where travel has become relatively easy and

tourism has increased dramatically over the last fifty years. *Ecotourism* is a subset of the tourism market and generally refers to commercial promotion of experiences with nature and wildlife, and includes extreme adventures, such as mountain climbing expeditions, consumptive game hunting trips, non-consumptive wildlife photo safaris, whale watching excursions, and many other forms of nature-related experiences. Some consider human-dolphin interactions to also be a type of ecotourism experience (Bulbeck, 2007). The American public is familiar with all types of ecotour activities, as well as representations of nature and wildlife in the media, and at aquariums, zoos, and theme parks.

People are accustomed to paying for many nature and animal-related experiences. "The dominant rationale for ecotourism, even among conservationists, is economic….The other dominant rationale for ecotourism is educational" (Russell & Russon, 2007, pp. 654-655). Because of the economic value of ecotourism, nature and wildlife are, to some degree, commodities; and ecotour operators and other venues that offer nature and wildlife experiences compete for consumer dollars.

Human-dolphin interactions at zoological facilities are complicated and expensive ventures to run. Whether operating as a for-profit or a non-profit business, they depend upon the revenues generated by their activities, and thus they must attract a steady stream of participants by offering a product that consumers want and also by effective marketing. Some people might perceive this underlying commercial aspect to compromise the merit of the activity, especially if they think that profits alone drive the organizations' decisions. It is likely that the way the dolphins are represented in

the facilities has a significant effect on people's perceptions about the integrity of the experiences and also on people's perception of the dolphins.

The Zoological Facilities' Representations of Dolphins

The human-dolphin interactions were carefully-crafted experiences that presented a particular version of dolphins to the public. First, the spaces established a tone for the interactions. Unlike typical zoos, the three research sites had no visible bars enclosing animals; and, unlike dolphin shows, there was no stadium seating and no sound system or musical accompaniment during interaction sessions. The spaces were designed to represent beautiful places in nature and the small intimate clusters of happy-looking people engaged in the interactions did not look intrusive. Like theatre, these settings implicitly asked visitors and spectators to suspend disbelief that they were in a constructed space. Certainly people could see the separation enclosures for the animals, the paved walkways, and, at one site, the pool ladders for entering the water; but the illusions created by naturalistic exhibits are known to be pleasing and familiar to zoo visitors (Davey, 2006; Finlay, et al., 1988).

The dolphins' water habitats were relatively large spaces, the water appeared clean with good visibility, and the sites had many features designed for visitor comfort and safety, including showers, lockers, and the requirement that visitors wear life jackets or buoyant wetsuits. In these settings, most visitors did not report being cautious or afraid to enter the water with unfamiliar, non-domesticated animals.

Furthermore, almost none of the visitor and spectator interviewees and fewer than 5% of the questionnaire respondents mentioned any thoughts about the circumstance of captivity. Of those who did, most of their statements suggested that the respondents had resolved their concerns. For example:

> I think sometimes you worry that the dolphins are in captivity and would rather be in the wild. However, the dolphins were obviously very happy and well cared for and didn't know any different as I believe they were born in captivity. They were under no pressure to "perform" but [they] were very happy to interact with all these strange people.

Second, the popularity of and fascination with dolphins in American culture are integral to attracting participants and, therefore, to the success of the businesses. In the human-dolphin interactions at the research sites, dolphins were represented in ways that map onto their media image. The dolphins were promoted as friendly and cooperative individuals with distinct personalities. They had names, and the trainers talked about each animal's preferences, learning achievements, and social interactions with their dolphin cohorts. The dolphins were presented in a kind of living diorama representing the ocean, as opposed to a choreographed show in a stadium. The interaction sessions had a relaxed, personal, and sometimes playful tone, and they were designed to engage the visitors' emotions and build a sense of connection with the animals. The trainers conveyed in their words and through their actions that they thought the animals were amazing, that they cared deeply about them, and that they had relationships with them that were special.

Although unscripted, most sessions contained variations of the same physical and sensory elements, and each element was directed by the trainers. The sessions did

not include spontaneous interactions initiated by either the visitors or the dolphins. This overarching control was presented as a precaution for the safety of the dolphins, as much as for the humans. Thus, there were rarely any surprises of the kind that one might experience in an encounter with an animal in the wild. Visitors did not report witnessing aggressive behavior between animals or other activities that they perceived to be negative. The trainers worked to make each session a positive experience for humans and animals alike. It might have been possible to leave an interaction experience thinking that dolphins in the wild are equally calm and friendly, although a few people mentioned that they had learned in the interaction that it is disruptive and potentially dangerous to try to feed or swim with wild dolphins.

Third, at the same time the dolphins were being personalized and shown to be friendly and positive, they were also represented by rational, scientific descriptions and explanations. The trainers focused on the animals' anatomical features, aquatic adaptations, and physical capabilities. Trainers talked about the species' natural behaviors, such as foraging strategies, range, reproduction, and social organization. Trainers also discussed various scientific research projects that involved the dolphins, and some of the technical equipment used in their care. The trainers explained about and demonstrated the method of training dolphins using operant conditioning with positive reinforcement. They never spoke in negative terms about the animals and they referred to the dolphins' actions as behaviors, not tricks.

The facilities in this study did not promote a mystical or spiritual representation of dolphins. I saw no evidence that they claimed the dolphins had

healing powers or that people could commune with them. However, I also heard of no efforts to dissuade visitors who might hold those views; and a few past-visitors wrote about their beliefs of the dolphins' special powers (e. g., the woman who believed she and her husband conceived a child because of interacting with the dolphins). Because "an individual who holds a deeply entrenched belief is unlikely to change the belief" (Chinn & Brewer, 1993, p. 15), it is improbable that the delivery of scientifically-based information in a 20 to 30 minute activity would influence people to reconsider their beliefs or misconceptions.

Presentation of Educational Content

In the human-dolphin interaction activity, educational content was presented as scientifically-based factual information. Given the brevity of the interaction sessions, it is not surprising that simple, basic facts were the most commonly-reported type of educational content. Visitors didn't report having engaged in inquiry activities, although a few mentioned question and answer exchanges, and there wasn't time for in-depth study of any complex scientific topics. The trainers saw themselves as much more knowledgeable than most visitors and they perceived that a basic-level of information would, on most occasions, be most appropriate.

However, the information was not delivered as factoids, tidbits of trivial information, such as two factoids that have circulated in the past: (a) the dolphins are smiling[42], and (b) dolphins have 88 teeth just like the 88 keys on a piano[43]. I also did

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[42] The upturned mouth of the Atlantic bottlenose dolphin (*Tursiops truncatus)* is an anatomical feature.

not observe a "cheerleader call-and-response pattern" (Davis, 1997, p. 120) that is sometimes seen in other types of group presentations.

Visitors also reported learning rather basic conservation information and suggestions for simple stewardship actions that individuals could take. Most of the stewardship tips they reported, such as the need to recycle, were likely to have been familiar since such topics are commonly in the media. Indeed, some visitors said the messages reinforced their existing knowledge. I did not get a sense that any issue was discussed in depth, and also visitors and trainers did not report having discussed some of the more contentious environmental problems, such as human over-population and Americans' over-consumption of resources. While the approach to education about conservation could be criticized as superficial, one must remember the short timeframe of the interactions, as well as the visitors' expectations for the experience.

Visitor Expectations

Most visitors were likely to have been on vacation or enjoying leisure time when they participated in the human-dolphin interactions at the three research sites. If they had just flown in a plane or driven their cars, they probably didn't want to be told about the energy consumption and pollution associated with those means of travel. They presumably wanted to have a good time and, in our culture, dolphins are commonly portrayed as happy, carefree, playful, intelligent, and friendly toward people. Human-dolphin interactions have gotten a lot of publicity and have even been

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[43] The number of teeth varies by species.

included in various lists of "Things to Do Before You Die." In this study, the past-visitors' motivations to engage in the interaction activity clustered in this way: 42% stated that they'd had a long-time interest in dolphins, 24% said they wanted to get up-close and personal with dolphins, 19% wanted to facilitate the experience for another, 12% said they did it "to have the experience," 2% mentioned education or learning, and another 2% would fit into Falk's (2009) category of *rechargers*. The attractive interaction facilities offered a safe way to meet those expectations.

American culture is replete with various constructed representations of nature, and also it is commonplace to pay for experiences related to nature, so these aspects of the interaction activity also fit into familiar expectations. About 10% of the visitor interviewees and questionnaire respondents mentioned the cost of the interactions, but almost all of them felt it was worth it.

Because memories are constructed realities rather than exact reproductions of events and may reflect popular language, mass culture, and stereotypes in their representation, the past-visitors' recollections about their interactions likely reflected ideas they had discussed with others, the facilities' embedded messages, and wider social constructions of dolphins. People expected to enjoy the experience with such a "cool" animal. There were a number of factors in the physical realm that likely contributed to the positive feelings and to the learning.

Potential Mediating Factors in the Physical Realm

Three intrinsic design features of the physical context of the human-dolphin

interaction activity at all three research sites may have contributed to participant

learning. First, participants could get close to living dolphins. Second, two of the three

types of participants were fully immersed in the dolphin's aquatic habitat. The third

feature was that two of the participant categories were eye-to-eye and on the same

plane as the dolphins. Although spectators were not in the water and eye-to-eye with

the dolphins, the experience of observing ordinary people (non-professional animal

handlers) in that situation enabled them to imagine themselves in the same context.

Thus, these physical factors may have mediated even the spectators' learning.

Close Proximity

All of the participants in the human-dolphin interactions were in close

proximity to living dolphins, animals that have aesthetic, scientific, and moral value

for many Americans (Kellert, 1999; Sickler, et al., 2006). Most people rarely, if ever,

encounter these animals in their daily lives. Even the spectators were fairly close to the

animals; one commented, "It was an amazing experience. It's rare to get so close."

Previous research shows that zoo "visitors get as close as possible to the

exhibit object/animal in museums and zoos" (Bitgood, 1999, p. 3), and that "greater

visibility and/or closer proximity lead to longer viewing times" (Johnston, 1998, p.

338). Close proximity to the living animal (in contrast to a model in a museum, for

example) was likely to have been an important factor that contributed to participants'

perceptions of having a connection with the dolphins since living animals typically

have high appeal to visitors, as reflected in this statement about exhibits at the

Monterey Bay Aquarium, "Visitors' most vivid memories were of the animals, which was not surprising considering that the living species are usually the most popular part of an exhibition" (Yalowitz & Ferguson, 2006, p. 7).

Visitors and trainers were close enough to touch the dolphins. Not only did this experience give them first-hand sensory input, but also many participants said that the touch conveyed intangible qualities of trust, friendship, and mutual understanding. Research about peak or profound experiences with wild cetaceans and a few other animals have identified close proximity and eye contact as two of the triggering agents for a deeply personal experience (DeMares, 2000; Smith, 2007). In this study, the close physical proximity to the dolphins prompted a few visitors to say that making eye contact was a transformative experience. For example, one participant from more than a year earlier said it created a personal bond and a responsibility:

> Any time a person can touch and look in the eye of an animal they create a bond. It is no longer just a picture or story in a book. They care about the wellbeing and future of the animal.

Immersion in the Aquatic Environment

The immersion nature of dolphin interactions appeared to command the visitors' and trainers' full physical, sensory, and mental attention. Although the spectators did not enter the water themselves, the fact that other people "just like me" were immersed and interacting with the dolphins seemed to create vicarious identification with the in-water activities. Those in the water were fully engaged, not distracted by eating, chatting, or other common practices in leisure pursuits. We know

that paying attention is an important prerequisite for learning (Bandura, 1969), and the immersion aspect of the human-dolphin interactions was likely to have strongly influenced participants to attend to what was occurring in the activity.

Humans and Dolphins on the Same Physical Plane

Being in the water, face-to-face with large aquatic animal**s,** is a highly unusual experience since aquarium and zoo exhibits typically separate the animals from the visitors and, in the wild, there are inherent dangers in being close to large predatory animals with sharp teeth. In most traditional dolphin pools, trainers and visitors stand above and look down at the animals (some facilities also have underwater viewing windows), and the animals typically can only interact with their trainers from a subordinate position. They have to look above the surface of the water for food and other reinforcements from humans.

The conceptual design of the human-dolphin interaction experiences placed visitors and trainers on the same plane and in the water with the animals, features that may increase visitor learning and enjoyment (Coe, 1985). A few of the trainers said they thought that a visitor's body position can enhance the feeling of connection. For example, one trainer said, "I wanted to get people down low so that they can get that eye connection with the dolphin, so we're not towering over [them]. You seem more connected when you're down low, intimate in the water with them."

One questionnaire respondent who participated in 2006 alluded to these intrinsic aspects of the context design for the experience when she wrote:

> Visiting an elephant orphanage in Thailand [was similar to the dolphin interaction experience]. Being in the water with dolphins was a more intense experience as it was entering their world (the water) rather than them sharing our world (like the elephants).

In addition to aspects of the physical setting, numerous elements in the social dimension of the interactions had the potential to have influenced learning, as well.

Potential Mediating Factors in the Social Realm

Membership in a Community of Practice

Participants learned as an aspect of their participation in a CoP that I called a community of animal enthusiasts although, to them, membership was probably "unconscious" (Astor-Jack, Keiehl-Whaley, Dierking, Perry, & Garibay, 2007, p. 219). When asked, most participants identified themselves as an *animal person* and a *dolphin person* (see Table 9.1). This type of community is comprised of people who, while not in physical proximity with one another as in the traditional sense of a neighborhood community, still have shared interests, tools, and activities.

Table 9.1.

Most Participants Identified Themselves as an *Animal Person* and a *Dolphin Person*

	Animal Person	Dolphin Person
Questionnaire respondents	93%	94%
Spectators	75%	81%
Visitors	80%	80%
Trainers	95%	95%

Of course the affinity identity, *animal person*, is only one of any individual's multiple identities connected to their "acting and interacting as a certain 'kind of person' or even as several different 'kinds' at once" (Gee, 2000, p. 99), and it is not connected to their genetically-defined or "natural" identity[44].

I asked participants to tell me what being an animal person meant to them. Their commonly-stated reasons for this identity included: (a) interest in and positive attitudes about animals, such as having what participants called, a "love of animals" and a "fascination with watching animals;" (b) involvement in animal-related activities, such as keeping pets, visiting zoos and aquariums, and doing recreational activities, such as horseback riding, snorkeling, and SCUBA diving; and (c) the use of animal-related tools, such as watching animal movies and nature TV programs. Many people stated multiple reasons for considering themselves to be an animal person, as shown in Figure 9.2.

It is likely that people did not list every involvement with animals that they experience. While a closed-ended question such as, "Have you ever had a pet?" might have prompted a higher percentage of pet owners, it would not necessarily have indicated identification with animals. Presumably, people answered this question with

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[44] Gee presents four ways to view identity, all of which coexist: (a) nature-identity is a state developed from forces in nature, such as sex or height; (b) institution-identity is a position authorized by powers in social institutions; (c) discourse-identity is an individual trait recognized by other "rational" individuals; and (d) affinity-identity is determined by experiences shared in the practice of affinity groups, such as the animal enthusiasts in this study (2000).

their most top-of-mind reasons for considering themselves to have an affinity with

animals, reasons that are likely to have the most significance to them.
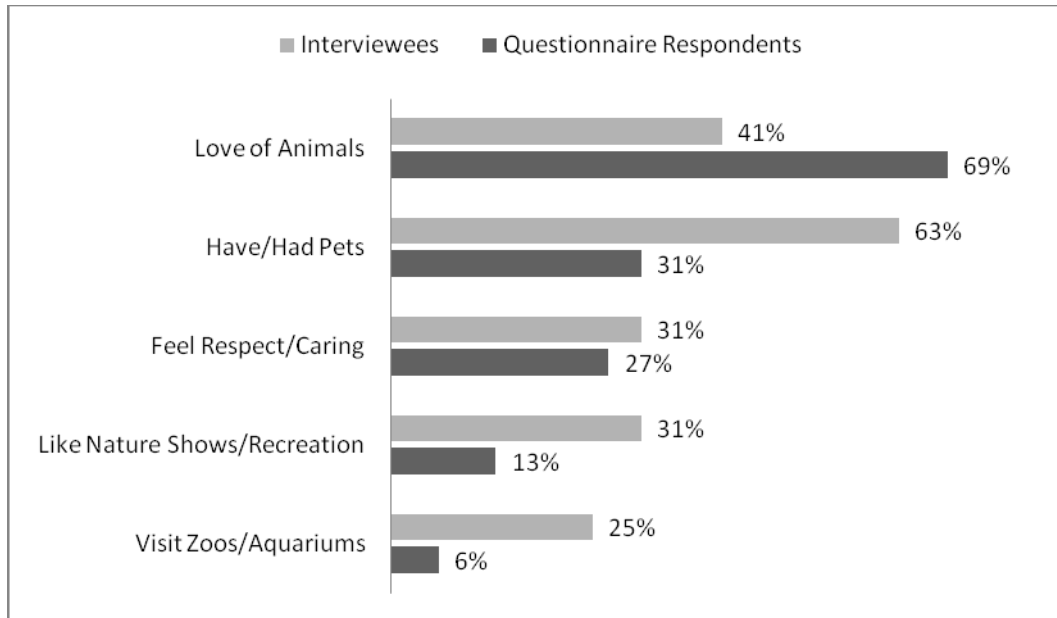
Figure 9.2. Most participants gave multiple reasons for considering themselves to be an *Animal Person*.

In addition to the categories shown in Figure 9.2, more than half of all

participants talked about their current pets, told stories from childhood about beloved

pets, commented about their jobs and volunteer experiences, aspirations, or specific

recreational experiences that involved animals, and made statements about their

philosophical outlook about animals. For example, one visitor from 2007 wrote:

> Animals are a part of our lives at any number of levels, including those that live with us and those with which we can safely interact in their environment. The more we know the better we are as individuals. They bring an additional significant value to our lives.

Animals were important to almost all the participants in this study and most people expressed far more attitudes of *affect* than *utility*[45] toward animals. The interactions were an animal-related recreational activity that fit into participants' already-established practices and reinforced their identity as an animal person. Most participants arrived with positive feelings toward animals, in general, and thus they were "probably predisposed to value and care about [all] animals" (Clayton, et al., 2009, p. 378), including the dolphins they encountered in this activity. As one trainer noted, "The [visitors] want to see the [dolphins] up close…It's a good confirmation experience for people who think they're a real animal person."

Not everyone claimed that an affinity with animals prompted her or his participation, however. A few people said that it was the social aspects of the interactions that attracted them. A woman who participated in 2002 recalled, "I had no intentions of doing a dolphin interaction until I saw others doing it…My experience was so fantastic." This type of social motivation that changed initial disinterest in the topic to some interest was also reported by whale watchers (Russell, 1999b, p. 127).

Interaction with Experts

Participation in the interactions gave the visitors direct contact with the experts in this CoP, the trainers. The trainers not only provided content information, but also modeled attitudes, beliefs, and behaviors that many said they admired. Most

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[45] Building on earlier work of Kellert (Kellert & Berry, 1980) and others, Serpell (2004) proposes a two-dimensional model of human attitudes toward animals, *affect* and *utility*. He contends that these exist as a continuum between positive and negative poles and are not independent of one another.

spectators, visitors, and past participants said that the trainers showed positive attitudes of respect and empathy toward the dolphins, demonstrated beliefs that dolphins have personalities and can be known as individuals, and modeled behaviors of patience, understanding, and relationship with the dolphins. Even the spectators, although they could not hear the trainers' speaking, talked about observing "respect" and about being impressed with the trainer-dolphin interactions.

Almost all of the visitor interviewees and the questionnaire respondents said that the trainers were integral to the interaction experience. One man who participated earlier in 2008 explained his views about the trainer's role: "The trainer acted as the 'translator,' and without her, I would not have been able to connect."

More than a third of the visitors and more than half of the spectators talked about the trainer and dolphin as a unit with a special bond between them. One trainer described the relationship this way: "I think a lot of times the newer trainers rely so much on the dolphin to make their program a good program. [The dolphins] and we are really partners out there…We're a team."

The visitors' animal-affinity identities appeared to have been validated and reinforced through their interactions with the trainers/experts while they (a) engaged in synchronous relationships with the dolphins, (b) modeled positive behaviors (described by the visitors and spectators as things like kindness, patience, and humor), and (c) spoke about ways they implemented their commitment to stewardship through simple, everyday actions. The value of watching the modeling of appropriate behavior toward animals, when coupled with direct contact with the animals, has previously

been demonstrated to facilitate a shift to more positive attitudes towards snakes (Morgan & Gramann, 1989), animals that are commonly regarded as significantly less appealing than dolphins (Kellert, 1993).

Although the visitors and spectators said they admired the trainers, most people did not say that they were seeking to become dolphin trainers[46]. This is consistent with my expectations for this large but loosely-connected CoP that is based on participants' affinity identification as animal enthusiasts, since all participants undoubtedly have many other identities in their everyday and work lives.

The interaction activity functioned a bit in the tradition of intent participation (Rogoff, et al., 2003) in the following ways: (a) the visitors (novices) were in the animals' habitat with the trainers (experts), even though this is, historically, a privileged position for employees in zoos; (b) the trainers were participating beside the visitors in horizontal interactions; and (c) almost all of the visitors and spectators watched (and also, in the case of visitors, listened) intently. Motivation appeared to be inherent in the interest in the activity. The voluntary nature of the activity, and also the fact that the trainers were not trying to teach the visitors to become trainers/experts, helped to create a relaxed atmosphere, akin to those described by Rogoff (2003), that didn't encourage a didactic mode of teaching.

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[46] A handful of visitors and questionnaire respondents said they aspired to become dolphin trainers and were taking the necessary steps to enter the profession. There were also a few participants who said they fantasized about being a dolphin trainer but that it was impractical for them.

Interactions with Co-participants

Sharing the human-dolphin interaction experience with like-minded co-participants reinforced the fun, the emotional impact, the learning, and participants' identities as people who cared about animals. For example, a visitor in 2003 said, "I liked the small group…we shared a common interest." Another visitor from three years earlier (2005) said, "It was also uplifting to watch a new appreciation develop in other participants."

The social interactions, including seeing others smile and appear to be enjoying themselves, heightened the positive feelings in all participant categories. One visitor interviewee talked about the social aspect of the experience even before she talked about the dolphins:

> First of all just the women in my group, we talked and bonded in just that little bit of time, which I thought was really exciting. We were strangers, but when they put us in that group we kind of became one and got to do what we wanted to do with the dolphin, if that makes sense. None of us have ever met before and now I know the one lady's birthday is tomorrow.

A past-visitor from 2006 described the group benefits this way, "…the group setting had a better impact, I think. We worked as a team and built camaraderie."

To a visitor from 1999, almost a decade earlier, the social dynamics were especially memorable:

> I liked the small group. I felt that the energy of the other participants added to the dolphin's energy. I'm not touchy-feely, so one-on-one time looking into the dolphin's eyes is not very appealing to me. I liked the excitement and energy of the group experience.

Interacting with co-participants also enhanced the informational discussions of

the visitors and trainers. People benefited from hearing others ask questions and contribute their perspectives. For example, a visitor from 1999 said, "By the time I was able to touch [dolphin name], I had gained a lot of info from the others in the group and it took me deeper into my curious zone."

Rehearsal

Talking about an experience after it has occurred is called *rehearsal* in the visitor studies' literature (Anderson, et al., 2007), and it is an important factor in remembering. The more a person rehearses the experience, the more salient the memory. Past-visitors reported that the human-dolphin interaction activity generated conversations afterwards which reinforced and built upon their learning experience.

Several visitor interviewees and a few questionnaire respondents said that they were glad to have shared the human-dolphin interaction with family members, especially so they could talk to them later about the experience. For example, a woman who participated longer than a year before wrote, "For me the biggest joy was knowing that I shared that experience with my family. It gave us so much to talk about and we knew the feelings we shared about the experience were the same!"

Visitors talked about wanting to tell others about their experience, such as this interviewee's comment, "I can't wait to get online and put my pictures on there—me with the dolphins for all my family and friends. I want to tell everybody about it and tell them to come to try it." Although I didn't ask about photos, about 10% of the past-visitors wrote that they had shown their interaction photographs and talked to others

about what they learned, such as this example from a visitor earlier in 2008, "I display my photos and talk to my friends about the oceans and their importance."

That visitor's statement illustrates an important theme that permeates this study: participants linked the human-dolphin interaction activity to the value of the ocean ecosystem. This connection appeared to be affected by not only the physical and social factors of the activity context, but also by factors within the personal realm.

Potential Mediating Factors in the Personal Realm

The experiential nature of participating in the interactions with living dolphins was a personal and complex form of learning. Although close to half of the people mentioned they had previously watched dolphins in nature shows on television, read books about them, and viewed them in the ocean or in marine park shows, many said the authenticity of the first-hand interaction experience was more vivid. For example, a visitor in 2006 commented, "It was just an amazing experience to be in the water with the dolphin and have all the knowledge that is in a book come to life."

A past participant from earlier in 2008 wrote that it was transformational, "Watching programs about dolphin's on Animal Planet [TV channel] is great but it's not the same as up close and personal. I think you are changed, and for the better, after your experience with them. It's so profound."

A few people explicitly said that the interaction was a peak or the best experience of their lives. For example, a man raved about his 2006 interaction:

> [It was] A peak life experience!...Yes, [similar experiences were] getting married, watching my children be born, seeing Yosemite for

the 1st time, climbing a mountain for the first time--many other firsts, especially involving animals and nature, were similar to this. It was something I'll NEVER forget as long as I live!

Clearly, the experience had a strong affective dimension that manifested in different ways in the personal realm of each participant's process of learning.

Emotional Affinity

More than 50% of the participants reported feeling an emotional connection to the dolphins. Some said it was a species-to-species connection, such as this statement from a visitor in 2007, "It's an incredible feeling to be in the water with them. You can't help but feel that there really is a natural human/dolphin connection."

Some interpreted the experience as a mystical or spiritual connection, as articulated by a visitor from longer than a year before: "I had an acute sense of emotional connection with them--hard to explain--almost ESP." Some identified with some of the dolphins' attributes, as shown in this spectator's comment, "They love interacting with people. I'm happy – I see my personality in them." A visitor from five years earlier felt that she had a unique personal connection:

> I very much identify with dolphins! I have always felt a closeness, as if perhaps I was a dolphin in a past life (I know it may sound silly...). Comparing myself with their characteristics, disposition, protective nature, personality and more, I see myself as the human equivalent.

About 25% of the visitors commented about the animals' individuality. For example, one visitor interviewee said, "I really liked seeing other people's interaction because it was different and it helped illustrate the personalities of the animals."

Additionally, a few visitors talked or wrote about specific dolphins by name, including visitors who had interacted with the dolphins many years in the past. A visitor from eight years in the past compared her experience to seeing dolphins in the wild: "What I loved about the interaction was seeing the personalities and the differences among the dolphins. In the wild you never get to know them as special individuals." The sense of affinity to the dolphins was pervasive in this study and part of many visitors' positive emotional responses to the experience.

Intentionality, Reciprocity, and Eye Contact

A few past visitors attributed intentionality to the dolphins by interpreting certain behaviors to mean that a dolphin had a particular attraction to them, as illustrated by this statement from a visitor who participated in an interaction seven years earlier in 2001: "[Dolphin's name] kept coming back to me and rubbing his head on my legs even when the trainer was having him go to the other people." Similarly, a visitor from earlier in 2008 wrote that repeated attention from the dolphin was a highlight of her experience: "One of the best experiences was when one dolphin kept coming up to me wanting to put its head in my lap. He wanted me to keep petting him." A 2006 visitor said, "[What comes to mind about the experience is that] it was incredible how [the dolphins] were drawn to me."

A comment from another visitor from more than a year earlier implied that the dolphin's intention was not only repetitive but also reciprocal: "One of the dolphins seemed to know how much I liked him and he kept coming back to me to have me

touch him even when he was supposed to go to someone else." This idea of having been singled out and "chosen" by dolphins corroborates previously reports in the literature (Bulbeck, 2007; DeMares, 2000).

A visitor from six years earlier still remembered the eye contact as a reciprocal experience: "[I felt that] there is a definite bond and communication between dolphins and humans. Looking into the dolphins' eyes proved to me that the dolphin was thinking and processing information about me as we touched."

A 2007 visitor wrote of "the penetrating eye contact with the dolphin;" and a visitor in 2006 described the eye contact as meaningful and memorable:

> When she swam up to me, her eye facing me, looked at me up and down, and made eye contact with me when I talked to her, it was amazing!! I will never forget looking into her eyes and her looking at me!!

Although visitor interviewees were less expressive about the dolphins' intentionality, reciprocity, and eye contact than past visitors who had thought about their experiences over time, a few interviewees mentioned these topics. For example, one visitor said, "It's being that close to him and then you first feed him the fish to kind of build that relationship…you get a chance to actually touch the dolphin and really look into his eye and it seemed like they kind of smile at you too." Another visitor interviewee said:

> The one lady put her face down towards the nose of the dolphin and you could tell that the dolphin was so excited that he just kept coming up to kiss her a little bit more and it was showing affection and that was really neat to see that the dolphins actually do that.

For a visitor who had participated in an interaction in 2007, the experience

heightened his feeling of *aliveness* to the point that his sense of time was influenced by the activity: "Time stood still. I had actually eye contact with [dolphin name]. I was so absorbed in the experience I was on a natural high for days."

Intention (including proximity), reciprocity (including eye contact), aliveness (e.g., amazement, heart-level feelings, respect, and sense of time influenced), connectedness, and harmony have been reported as five aspects of *wild-animal-triggered peak* experiences in spontaneous encounters with cetaceans (DeMares, 2000). Perhaps perceptions of these same elements in the constructed experiences in this study contributed to the powerful personal impact on some participants.

Interpreting intentionality and reciprocity in the dolphins' behaviors, attributes more commonly considered to be human qualities, were just some of the ways that participants likened dolphins to humans, a practice known as anthropomorphism.

Anthropomorphism

There are many viewpoints about anthropomorphism, defined as "the attribution of human mental states (thoughts, feelings, motivations, and beliefs) to nonhuman animals" (Serpell, 2003, p. 83)[47]. Scientists tend to distinguish between understanding the behavioral propensities of animals and anthropomorphism. On the other hand, to pet owners, "animals play the role of a family member, often a member with the most desired attributes" (Beck & Meyers, 1996, p. 247).

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[47] It is beyond the scope of this study to debate the pros and cons of anthropomorphism. What is important here is that many of the participants in this study talked about the dolphins in terms of human characteristics.

Participants talked about dolphins in ways that showed that their basic views of them were transformed. For example, a spectator said, "Once you've seen how friendly and so lovable they are, you go away with a fondness for them that you didn't have before." Anthropomorphism, especially the attribution of human cognitive and emotional characteristics to dolphins, was prevalent among participants in this study.

Dolphins are generally considered to be intelligent and close to 75% of the visitors and spectators mentioned this attribute. One 2007 visitor took an extreme view in her comment: "I am convinced that they have a higher level of intelligence than humans (or perhaps 'different')."

More than 25% of the spectator and visitor interviewees, and the questionnaire respondents described the dolphins as "friendly". Participants used a wide variety of other human-like descriptors, as well, such as "gentle," "lovable," "patient," "sensitive," and "a sense of humor." Although almost all of the human-like qualities that people talked about were positive attributes, a couple of people talked about some negative traits. For example, a visitor in 2001 wrote, "[I was surprised] how dolphins are like people. Some people don't like each other and dolphins are the same."

That many participants in all categories talked or wrote about the dolphins in terms of human characteristics likely helped to increase empathy toward the dolphins and forward their motivations to take stewardship actions.

Caporael and Heyes explore this idea:

> Attributing human characteristics to animals is a way of changing the values we place on them and how we behave toward them. Anthropomorphism is part of changing social values; specifically …values related to the environment….We suggest anthropomorphism

> links scientists and like-minded scholars with environmental/animal rights issues in the larger society….[Attributing] human characteristics to animals…changes the way humans perceive animals, and limits and entrains what actions are conceivable, possible, undesirable, and essential (1997, pp. 12-14).

A past-visitor from 2006 expressed a similar opinion:

> I am so grateful for the experience…I have fantasized about writing a book about the individual [dolphins] so other people would really get their unique personalities. Some may criticize this anthropomorphism but I see great value in people coming to relate with animals that are more often seen in the wild. It motivates them to protect the wild.

Anthropomorphism was one construct that some participants drew upon in their process of making personally-relevant meaning in their interaction experiences. For others, feeling an emotional affinity to and respect for dolphins as distinct, nonhuman-like animals was meaningful and personally-relevant. In either case, affective factors seemed to be mediators for learning in the personal realm.

Positive Nature of the Interspecies Contact

Across all categories of participants, the human-dolphin interaction activity was a positive experience. As expected, there were many variations in what and how people learned through their participation, yet almost everyone reported a more favorable attitude towards the individual dolphins they met. Similar to what we know about the benefits of intergroup contact between unfamiliar groups of humans, the participants in this study gained improved attitudes towards all dolphins because of their positive interspecies contact with the ones they met in the interactions.

The brief exposure to a different other helped to reduce fears and uncertainty (Lee, 2001) and participants reported feeling empathy. Empathy is known to influence people's motivations to act in a more supportive manner for others (Batson, et al., 1995; Batson, et al., 1997). By learning about the dolphins, participants said they saw them in individuated and personalized ways (Dovidio, et al., 2003, p. 10).

Discussion: Shift in Identity

The collective influences in the interactions moved participants in a particular direction of change in their learning, what Lave calls *telos* (Lave, 1996), towards stronger identities as environmentally-caring and responsible individuals who take stewardship action. This shift undoubtedly occurred to different degrees along a continuum of the level of stewardship action that any individual took or will take.

Most people said or wrote that the human-dolphin interactions could generally raise awareness about conservation, because "by learning [about dolphins, people can] better understand the dolphins' need for protection and preservation along with their environment" (2002 visitor).

Almost all interviewees and questionnaire respondents stated that they cared about the dolphins and that they would expect a person who cares about dolphins to engage in some form of conservation activities. One visitor remarked, "I think seeing dolphins up close makes you realize how important these creatures are and you get a better understanding for how important it is to preserve our oceans." Although some participants made contradictory statements, such as this comment written by a 2007

visitor, "I'm not sure my ideas have changed, but I do feel more protective of the [dolphins];" others said that the interaction experience was reinforcing: "My commitment to conservation and wildlife was reinforced and I started sharing my beliefs on these topics with more friends and acquaintances" (2001 visitor).

Although there is no way of knowing the state of stewardship involvement or readiness of the participants who arrived at the human-dolphin interactions, a majority of the participants (78% of interviewees and 54% of the questionnaire respondents), said their interaction experience inspired them to do something in their personal lives.

The participants in this study gave a wide range of specific examples of how their ideas about conservation and/or their stewardship behaviors had shifted because of their experiences in the human-dolphin interactions. Figure 9.3 shows a sampling of statements from various past visitors about what they were inspired to do. The statements are organized along a continuum ranging from internal thinking to political activism intended to influence policy makers.

Only a few people mentioned political activism or voting for pro-environmental candidates, a finding similar to that of The Ocean Project's national survey of 22,000 Americans (2009). At the other end of the continuum, only a few people revealed a beginning level of environmental awareness, such as an example written by a participant in 2007, "I had no idea how living in NYC and throwing a cigarette butt in the gutter can impact the sea." Most people mentioned actions that individuals can realistically take, suggesting that they, like the respondents to The Ocean Project's survey, have a "belief in the potential for individual actions to

positively impact the environment and ocean" (The Ocean Project, 2009, p. 8).

Internal Thinking
- "I'm reading more scientific papers about their cognitive skills and physiology; and how we can do more to protect the wild populations and be more sure about the safety and the wellbeing of the animals under human care" (2008 visitor).
- "I try to pay more attention to environmental issues and conservation" (2005 visitor).

Actions in the Home
- "I try to be more careful of how I dispose of things that could end up in our ocean" (2006 visitor).
- "After a recent trip to [site] I bought re-usable grocery bags. I thought about what plastic bags do to animals in the wild, and I [wanted to prevent that] for other animals" (2004 visitor).
- "I was never much of a recycler before. I started recycling after my interaction" (2007 visitor).

Consumer Choices
- "I carpool more and now only eat dolphin -safe tuna" (2007 visitor).
- "I have begun to purchase only energy efficient light bulbs and am more careful about the types of seafood that I eat" (2006 visitor).

Influencing Others
- "I teach my students about [the dolphins] and the importance of keeping our oceans clean and safe" (1995 visitor).
- "My commitment to conservation and wildlife was reinforced and I started sharing my beliefs on these topics with more friends and acquaintances" (2001 visitor).

Supporting Conservation Groups
- "We have donated to organizations to help injured dolphins. I talk to those around me" (2000 visitor).
- "I have donated to four [animal-protection] organizations. I just realized after reading this question that all these donations were AFTER our dolphin experience!" (2007 visitor).

Choosing Conservation-Related Careers
- "I have become a Marine Mammal Medic with the British Divers Marine Life Rescue organisation in England, so I can help to save stranded dolphins and whales" (2000 visitor).

Political Activism
- "I am participating in policy changes on an international level regarding the whaling done by Japan" (2008 visitor).

Figure 9.3. The kinds of stewardship actions that past visitors were inspired to take fall along a continuum of involvement from internal thinking to political activism intended to influence policy makers.

Since identities tend to be affirmed and strengthened through social interactions with like-minded others (Burke, 1991; Stets & Burke, 2000), the animal enthusiasts in this CoP were not only inspired by the trainers' modeling, but also they reinforced and encouraged one another to embrace a more-active stewardship role in caring for animals and the environments necessary for their wellbeing.

Implications

Theoretical implications

The CoP model of learning embedded within situated learning theory was a powerful theoretical framework for this investigation. Enthusiasm for animals was a commonality among the participants, and the CoP model of learning accommodated the diversity of knowledge, experience, motivations, and goals that existed among the individual participants. It also allowed for different types of participation from peripheral to more central. In the CoP framework, the social dimensions of shared activity within the community are integral to the process of learning. Visitor studies research shows that most people visit designed settings with one or more companions (Falk, 2009), and the present study suggests that building upon the inherent social nature of typical zoo visits may enhance learning in these settings.

Although a few studies have taken a CoP approach to investigate learning in museums (e.g. Abu-Shumays & Leinhardt, 2002; Ash, 2002; Kelly, Cook, & Gordon, 2006), this theoretical lens is still a fairly rare approach for educational research in zoological settings. This study models one way to apply the CoP theoretical

framework in these settings. This theoretical lens (a) recognized the broad sense of "community" of the visitors and employees, (b) embraced the complexities that affect and are inherent in participants' experiences at zoos, aquariums, and marine parks, (c) viewed learning as within the province of the learners who develop and acquire knowledge through their active participation in collaborative endeavor, and (d) looked for a "range of learning outcomes [that] far exceeds the typical academic emphasis on conceptual knowledge" (NRC, 2009, p. 27).

In addition to the potentially valuable insights that may come from taking a broad view of community, this study also suggests that taking a broad view of learning may reveal evidence of multiple types of learning. In the spate of recent research, it has become increasingly accepted that trying to define learning in designed settings by knowledge gain alone is insufficient (Astor-Jack, et al., 2007; Banks, et al., 2007; Falk, 2009; Falk, et al., 2008; Falk & Storksdieck, 2005; Fraser & Sickler, 2009; Heimlich & Storksdieck, 2007). The two new frameworks for science learning in informal settings from the National Science Foundation (Friedman, 2008) and from the National Research Council (2009) both validate the importance of an array of outcomes that are not limited to acquisition of information alone. These new publications are important contributions toward establishing common frameworks for research in designed education settings and they were timely and invaluable guides in this project.

Learning was widely evident in this CoP activity. The present research corroborates previous studies that show learning in designed settings involves both

cognitive and affective dimensions, and that people make meaning of their experiences in personally-relevant ways (Falk & Dierking, 2000; Heimlich & Storksdieck, 2007; Matusov & Rogoff, 1995; NRC, 2009). However, some of the personally-relevant meanings of some of the visitors reflected mystical beliefs and misconceptions. Although the research sites presented scientifically-based information about the dolphins, they also personalized the animals in ways that supported popular perceptions of dolphins. The brief interaction activity did not allow time for in-depth study or for sensitive challenges to visitors' misconceptions.

This investigation also suggests that, within a CoP theoretical model, multiple visitor entry identities (Falk, 2009) can be validated and reinforced through the learning process in ways that may lead to identity shifts (Lave, 1996). Falk argues that "museum visitors' identities, motivations and learning are inextricably intertwined" (Falk, 2006). By understanding that multiple identities are enacted by every person (Gee, 2000), designed settings, with their unique resources, offer opportunities for visitors and employees to try out different identities, even briefly, and to get existing ones reinforced. This is an aspect of what Rounds (2006) calls *identity work*.

As revealed in this study, participating in community activities with other animal enthusiasts can support and encourage individuals in taking the steps to become more active stewards of the natural world. Through a powerful experience at a zoo, for example, participants may shift their identities to embrace the following visitors' sentiment: "Okay, [stewardship] is something that I've gotten out of a bit, but

I have to do my part now. I can't put it off on everybody else. It's something I have to be involved in, too."

Practical implications

Zoos and aquariums have the potential to reinforce values and attitudes about conservation (Falk, et al., 2007); and they can provide multiple reinforcing experiences that are likely to be beneficial in influencing action (Chawla, 1999; Smith & Broad, 2008). This research suggests that there are various factors in an experience in a zoological setting that have the potential to mediate learning and to shift participants' identities towards becoming more conservation-minded and active stewards. These include (a) having close contact with living animals; (b) experiencing sensory immersion in their environment; (c) meeting animals eye-to-eye and on the same plane; (d) engaging with like-minded co-participants; especially those with whom one can discuss the experience later; and (e) interacting with experts.

When participants in this investigation were able to make connections between the interaction experience and their interests, such as their general favorable feelings about animals, especially pets, and between familiar constructs, such as the idea of interspecies relationships, the zoo experience became more personal. The personal nature of the experience typically led to strong positive emotional reactions and feelings of emotional affinity with the animals they met. For many people, empathy for dolphins and motivation to help them were influenced by anthropomorphic interpretations of the experience.

Although this project benefited from the popularity of a particular type of animal, the dolphin, there is no reason to doubt that activities in zoological facilities that include some of the potential mediating factors in this research could have a similar influence on learning. By providing socially-mediated opportunities for close contact with living animals and for interaction with experts, zoological facilities may see greater engagement and learning by both the visitors and staff. By supporting the situated identities and communities of like-minded people, and framing the content to link with familiar constructs, zoological facilities may also see greater success in promoting conservation awareness and action as more people begin to identify themselves as environmentally-caring and responsible individuals who take stewardship action for the benefit of all living creatures.

This research also has implications for the way learning activities in K-12 classrooms and schools are organized. It suggests that communities of practice organized around domains of interest could encourage learning. When people engage in socially-mediated activities with like-minded co-participants, some of their interests, knowledge, and attitudes can be reinforced. Individuals can also develop stronger identification with others who share the common group membership (Brewer, 2001; Gutierrez & Rogoff, 2003). Novices and experts can interact together and parallel to one another, and an individual's participation both can influence and can be influenced by others. The different perspectives of the different types of co-participants are also potential mediators of participants' meaning making (Hanks, 1991). Within shared activities, "the new experience allows individuals to build new

relations with other people and with the subject matter, and to redefine old relations" (Matusov & Rogoff, 1995, p. 101).

A second implication for K-12 education can be stated briefly. A social perspective of learning, as discussed in the present research, views learning as much broader than just the cognitive mastery of facts, concepts, skills, or behaviors. Learning is the vehicle for a person's development of intellect, attitudes, preferences, skills, emotional states, and the accompanying sense of self that is incorporated internally and presented to the external world (Penuel & Wertsch, 1995; Vygotsky, 1978; Wenger, 1998). When this broad view of learning is taken, multiple types of learning, beyond knowledge gain alone, can become evident and can be valued.

Chapter Summary

This chapter identified some of the many factors that may have mediated learning in the human-dolphin interaction activity. It discussed some of the cultural and historical aspects of life in contemporary that likely influenced the ways that the zoological facilities constructed the settings, represented the dolphins, and presented educational content. The participants' expectations for their interaction experiences were also influenced by the broader social construction of ecotourism and of dolphins.

Some potential mediating factors in the physical realm were close proximity to the dolphins, immersion in the aquatic environment, and interacting eye-to-eye and on the same plane as the dolphins. Potential mediating factors in the social realm were membership in the CoP, interactions with experts, interactions with co-participants,

and rehearsal (talking about the experience afterward). Potential mediating factors in the personal realm were feeling emotional affinity with the animals, a sense of the dolphins' intentionality, reciprocity, and making eye contact, anthropomorphism, and the positive nature of the interspecies contact. The chapter also described how the various factors, when taken collectively, influenced a shift in identity among the participants.

The chapter ended with a discussion of the theoretical and practical implications from this research. The CoP was a powerful theoretical framework and taking a broad view of learning revealed multiple types of learning. This study suggests that designing learning activities using this approach might help to promote learning in both designed settings and K-12 schools.

X. CONCLUSION

This project set out to establish baseline information about learning in the human-dolphin interaction activities in three zoological facilities in the United States. The dolphins were central participants and had obviously learned many things in order to interact safely with the public under the guidance of professional animal handlers; however, the focus in this study was on the learning of the human adult participants during their interactions.

Overview of the Research

Education is at the core of the mission of most, if not all, aquariums and zoos in the United States (Patrick, 2007), and education about marine mammals is mandated by United States federal law (U. S. Congress, 1972) in order for public-display zoological facilities to have marine mammals in their collections. However, there has been limited research on learning in aquariums, zoos, and marine parks (Bruni, Fraser, & Schultz, 2008; Dierking, et al., 2002; Falk, et al., 2007; Spotte & Clark, 2004; Wilson & Zimmerman, 2006). To address this need, I collected and analyzed data to answer the research question, *what do people learn in interactions with dolphins at zoological facilities*?

I approached this descriptive study from a constructivist paradigm, drawing on sociocultural situated learning theory, specifically a Community of Practice (CoP) model of learning (Lave & Wenger, 1991), as the theoretical lens for the investigation.

This framework allowed for the diversity of knowledge, interest, motivations, and goals that existed among the visiting public and the employees at the three commercial zoological facilities that were the research sites, and also for varied types of participation, from peripheral to more central. The self-reported commonalities of the participants in this study that constituted membership in the broad CoP were shared interest in and experience with animals, enabling me to consider them to be a community of animal enthusiasts.

In this study, the term *learning* was defined as change which occurs through participation, a process of active engagement with an activity or experience. In this view, the focus is on the dynamic process of transformation, as contrasted with the possession of bits of knowledge that have been transmitted by another (Rogoff, 1995). The changes could have included (a) knowing certain information that was not known before, (b) becoming aware of perspectives and attitudes of which one was unaware before, (c) developing skills that were absent or previously undeveloped, (d) gaining greater confidence or a sense of agency about one's potential, (e) seeing connections between and synthesizing information in new ways, (f) expanding affinities or shifting other aspects of one's identity, and so on.

The process of learning occurs in the personal, social, and cultural planes (Cole, 1996; Hein, 1998; Rogoff, 1995; Vygotsky, 1978) and is lifelong, life-wide, and life-deep (Banks, et al., 2007). This perspective of learning is regarded as a socially-mediated process in which individuals construct meaning through interacting with (a) signs, including speech, language, and gestures; (b) artifacts, that is cultural

expectations and behavioral norms; and (c) tools, objects that have been created through human activity (Cole, 1996; Vygotsky, 1978). This definition of learning does not require intentionality or even awareness on the part of the participant.

There were three categories of adult participants: (a) visitors were members of the public who interacted in the water with living dolphins at one of the zoological facilities under the guidance and supervision of professional dolphin trainers; (b) spectators were those who watched the human-dolphin interactions from the periphery but did not, themselves, go into the water; and (c) trainers were the employees of the research sites who led the interactions. They were the most centrally-involved and held the role of experts. I interviewed the spectators, visitors, and trainers (collectively, n = 51) and got detailed responses to an online questionnaire from 933 visitors who had participated in the human-dolphin interaction from eight months to 18 years in the past.

The different categories of participants had different means of learning available to them: (a) the visitors (and past visitors) watched and listened at close proximity and had multisensory contact with the dolphins while immersed in their aquatic habitat, (b) the spectators watched from close distances on the shore, and (c) the trainers had access to all the same means as the visitors and also learned through the process of teaching and managing the visitors and the dolphins in the dynamic interaction activity on an ongoing basis over time[48]. Because of the diversity among

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[48] The median length of time that individuals in this study had been a dolphin trainer in the interaction activities was four years.

the individual participants, and the differences in role and learning modalities of the different participant categories, not everyone learned the same things.

I drew upon two important newly-published frameworks for analyzing learning in informal environments: (a) the National Research Council's Six Strands of Science Learning (NRC, 2009), and (b) the National Science Foundation's Framework for Evaluating Impacts of Informal Science Education Projects (Friedman, 2008). I used these frameworks to code, categorize, and analyze the corpus of data. This process revealed abundant evidence of learning in multiple and often interconnected categories.

Summary of Principal Findings that Answer the Research Question

In this study, there are five principal findings that show what adult participants learned in the human-dolphin interactions at the three research sites. The visitors, spectators, and trainers in the human-dolphin interaction activity were heterogeneous in their backgrounds, interests, and motivations, and thus it is not surprising that they made sense of their personal experiences in dramatically different ways. As expected, not all participants learned the same things. This outcome affirms the notion that, "informal science education…is a field in which multiple outcomes are the norm, and where learning is often the result of combined, interwoven and often overlapping experiences (informal, formal and everyday)" (Dierking, 2008, p. 20).

The first finding is that all the visitors, spectators, and trainers gained new knowledge. They learned new information in three broad categories: (a) dolphin

physiology and natural history, such as their size, anatomical features, reproduction, diet, and social behaviors; (b) zoological activities about the care and training of dolphins, such as their preventative health care program, positive reinforcement and operant-conditioning, and the dolphins' involvement in scientific research projects; and (c) conservation, such as various environmental issues that affect dolphins and the larger ocean environment, as well as information about stewardship actions. Individuals stated or wrote both general concepts in these topics and specific factual details that covered a range of knowledge that participants had learned. Many participants also stated or wrote metacognitive reflections about their learning, thereby showing that they were aware of their gains in knowledge and skills, despite the fact that only one visitor interviewee and 22 past visitors explicitly stated that learning was one of the reasons they wanted to engage in the interaction activity.

Second, visitors, spectators, and trainers all constructed meaning in and from the experience by connecting it to experiences, beliefs, and familiar practices outside of the interaction context. Some individuals made connections to highly personal experiences, thereby resulting in idiosyncratic meanings. Most participants associated the interaction experience with familiar beliefs, such as trust and empathy, and to common practices, such as relationships like friendships and the notion of having animals as companion pets. Almost all participants associated the interactions with conservation, a global view of protection and preservation of dolphins and their natural environment.

Third, through their participation in the human-dolphin interaction experience, most participants in all three categories shifted their attitude and gained a sense of personal agency about beginning or increasing stewardship actions. They talked or wrote about their intentions to act or, in the case of the past visitors, the actions they had been inspired to take to benefit dolphins and the ocean environment. "An intention is a representation of a future course of action to be performed. It is not simply an expectation or prediction of future actions but a proactive commitment to bringing them about" (Bandura, 2001, p. 6). Intention involves forethought, self-directedness (involving motivation, affect, and action), and moral agency (involving not only cognition about morality but also moral judgment, personal standards, and situational circumstances). The interaction experience and the connections that participants made beyond the immediate context led to participants' learning that they had the capacity to exercise some influence over environmental events. This sense of agency constituted a subtle shift in their identity toward being a more active steward of the natural world.

Fourth, the trainer and visitor participants learned new skills through the human-dolphin interactions. Visitors learned interspecies etiquette skills related to meeting dolphins face-to-face in their aquatic environment. The trainers learned dolphin training and management skills, people management skills, and teaching skills.

The fifth finding is that visitors had long-lasting and vivid recollections of what they learned during their participation eight months to 18 years in the past.

Seventy percent of the 933 questionnaire respondents had participated in the interactions more than eight months in the past, and most of them wrote remarkably detailed and often enthusiastic statements. They had a lot to say about their interaction experience, and most of them gave specific details about the information and skills they had learned, the meaningful connections they had made, and the new stewardship attitudes and behaviors that they had adopted.

In addition to the differences in the means by which the different participant types could learn, there were many additional factors that had the potential to influence learning in this study.

Summary of Potential Mediating Factors

There were multiple factors in the human-dolphin interactions that influenced the meanings people made of the experience. The interaction activity was embedded in the cultural and historical context of contemporary American society, although participants were probably largely unaware of these factors while actively engaged in the activity. Constructed representations of nature are commonplace, as is the practice of charging fees for experiences with nature and wildlife. In popular American culture, dolphins are commonly portrayed as smart, happy, playful, and friendly, and the interaction activity reinforced many of those perceptions.

In addition to representing the dolphins in personalized ways, the facilities also presented scientifically-based information about dolphins and conservation for a basic-level of content learning. The trainers modeled both personalized relationships with

the dolphins and more-clinical ways of interacting with the animals in their training, husbandry procedures, and research protocols. The sites did not promote mystical or spiritual beliefs about dolphins although some of the visitors reported strong beliefs that had no grounding in science. The short timeframe of the experience limited the possibility of challenging deeply-held misconceptions about scientific content.

Physical Factors

Based on previous research (Bulbeck, 2007; Coe, 1985; DeMares, 2000), there were three intrinsic design features in the physical context of the human-dolphin interaction activity at the three research sites that may have contributed to participant learning: (a) participants were in close proximity to living dolphins; (b) the activity involved full immersion in the dolphin's aquatic habitat; and (c) the activity put participants eye-to-eye and on the same plane as the dolphins. Although the spectator participants did not go into the water and meet the dolphins eye-to-eye, the experience of observing people "just like me" (non-professional animal handlers) in that situation enabled them to imagine themselves in the same context.

Social Factors

According to visitor and spectator statements, sharing the human-dolphin interaction activity with other animal enthusiasts in this CoP reinforced the fun, emotional impact, and learning, and affirmed the participants' identities as people who care about animals. Co-participants provided different perspectives that helped

mediate learning. Participants who shared the interaction experience with family members or friends further benefited from opportunities for joint rehearsal afterwards.

While interacting with and watching the experts in this CoP, the trainers, the animal-affinity identities of the other participants were validated and reinforced. The trainers modeled positive behaviors when interacting with the animals; and the dolphins and trainers working together modeled relationships that were viewed as positive and reciprocal. Most visitors and spectators said they admired the trainers. Through watching and interacting with these experts, the other participants gained a sense of agency that they, too, could be more active in caring for animals.

Personal Factors

There was a strong affective dimension to participants' experiences. Without exception, all of the participants in all three categories were interested and engaged in the activity. It got their focused attention, an important prerequisite for learning.

Participants came to the activity with different personal motivations. Although only one interviewee and 22 questionnaire respondents mentioned education or learning as a reason for watching or enrolling in the activity, most visitors, spectators, and trainers reported that they had learned through their participation.

Almost all of the visitors, spectators, and trainers expressed positive feelings about the activity. For example, 94% of the interviewees and 92% of the questionnaire respondents used a variety of effusive complimentary words that included "amazing" and "fabulous" when talking about the interactions. The strong emotional responses

associated with the activity made the human-dolphin interaction experience memorable.

More than half of the participants said they felt an emotional affinity with the dolphins. The trainers promoted this feeling of connection by highlighting the individuality of each dolphin. Some participants interpreted this with an anthropomorphic lens, attributing human attributes to the dolphins, such as friendship, respect, preference, intentionality, and reciprocity. This perspective influenced a shift from simply caring about the animals to wanting to care for them. Whether or not participants anthropomorphized, the positive, close, and personal contact with this non-human species is likely to have influenced more favorable attitudes towards the individual dolphins and also towards dolphins, in general.

Summary of the Effectiveness of the Community of Practice Framework

The CoP theoretical framework in this study accommodated the diversity of knowledge, experience, motivations, and goals that existed among the various animal-enthusiast participants. Furthermore, it allowed for various types of participation from peripheral to more central. In the CoP framework, the social aspects that are commonplace in zoos were recognized as integral to the process of learning.

Shift in Identity

As the participants engaged in the socially-mediated human-dolphin interactions with like-minded co-participants, including experts, some of their

interests, knowledge, and attitudes were reinforced and they developed stronger identification with the collective identity and with the subject matter in the CoP. It is likely that the combined influences in the interactions moved participants towards stronger identities as environmentally-caring and responsible individuals who take stewardship action.

Implications

The CoP theoretical framework holds promise for future educational research in designed settings. This perspective can accommodate the inherent complexities of the diverse audiences and their varied experiences in these contexts; it can enable learning to be viewed as active participation in collaborative endeavor; it encourages looking for and valuing a range of learning outcomes that go beyond conceptual knowledge, alone; and it supports the identity work (Falk, 2009; Rounds, 2006) of individual visitors and employees within a collective community.

This research also suggests that in activities in zoological settings, there are some factors in the physical, social, and personal realms that may have a strong influence on learning, attitudes, intentions, and actions. By incorporating such elements in their public activities, zoological facilities may increase their effectiveness in education efforts and in promoting stewardship.

Concluding Remarks

This research contributes some baseline information about what participants

learn through human-dolphin interactions, information that has been needed in the field of marine mammal education for a long time. In addition to what people learned, this study also revealed the means by which participants learned, and some of the factors in this activity that may have mediated the learning. Rich evidence of the multifaceted learning came from the participants' voices. The large number of past visitors, 933, who cared enough about this topic to take the time to respond to the online questionnaire months, and often many years, after their interaction experience is noteworthy, as are the detailed and lengthy written statements that many of them submitted.

The data show that human-dolphin interactions were powerful experiences for the visitors, spectators, and trainers. Almost all participants learned in multiple categories, enjoyed themselves, and became more aware of and involved with stewardship.

A final narrative exemplifies the vivid recollections and personal meanings of one visitor who participated in the interaction eight years in the past:

> I found my time interacting with the dolphin was very peaceful. The problems and troubles in life seemed to disappear during that time. I look forward to having my kids engage in a similar dolphin interaction program once they are old enough… I upped my learning about them and began conservation efforts through donations…Some of the background information provided was the species of dolphins involved in that particular program, their age, weight, how they give birth (i.e. dolphins are born tail first as so the newborn does not drown during the birthing process). Other topics included diet, how they play/exercise, and conservation issues with these threatened animals…It was great to be able to interact with the dolphins on their turf. There is so much we still don't know about them. The experience brought me closer to understanding them and a desire to learn more about them. I still look at the photos that were taken of me and the

> dolphin and I look forward to a future interaction program again…No other program has brought me so close to wildlife. Sure there are zoos and animal parks, but nothing compares to actually being able to touch and interact with these mammals.

Participant responses like this contributed to answering my research question. Like the majority of the other participants, this man's interest, emotions, awareness, and knowledge about dolphins, and his sense of agency and identity in relationship to stewardship were transformed through his experience in the human-dolphin interactions.

APPENDIX A: VISITOR INTERVIEW QUESTIONS

1. First of all, tell me about it.
   a. Probe 1 – What did you do?

2. Have you had experiences that are similar to your dolphin interaction before?
   a. Probe 1 - Tell me about them.

3. Why did you decide to do the dolphin interaction today?

4. Sometimes people have an idea about these experiences before they do it themselves. How have your ideas changed since you were in the water with the dolphins?

5. What kinds of things can people learn in these experiences?

6. Sometimes these interactions inspire people to do something related to dolphins when they get home. How about you?
   a. Probe 1 – What do you think you might do?

7. Examples of questions asked during video segments:
   a. Probe 1 - Tell me more about what were you thinking then? And now, what are your thoughts about it now?
   b. Probe 2 - And now, what are your feelings about it now?
   c. Probe 3 – What things do you know that you didn't know before?

8. Some people consider themselves to be an animal person; others, not really. Do you consider yourself to be "an animal person"?
   a. Probe 1 - Tell me more about that.

9. How about dolphins? Do you consider yourself to be a dolphin person?
   a. Probe 1 – Tell me more about that.

10. When I think of people who are birdwatchers, who love birds, I imagine that they would use natural methods of pest control in their gardens at home, in order to help protect birds. So suppose you had a friend who said, "I love dolphins and I care about them", what kinds of things would you imagine them doing in terms of conservation because they love dolphins?
    a. Probe 1 – Any other things?

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11. There are a lot of ways to organize these dolphin interactions. What if, instead of being part of a small group of people, it had been just you, the dolphin and the trainer?

12. Following up on the last question, how might your experience have been different if it had been just you and the dolphin, without the trainer?

13. Imagine that a child back home asks you about swimming with the dolphins, what story would you tell them about the experience?

14. I want to be sure that I got down what you meant in one of these earlier questions. When we talked about [fill in one of the topics], I've got down that you said _____. Did I get it right? Is there anything else you'd like to add to that?

15. Will you please write a postcard to a friend to tell about parts of the experience that were meaningful or important to you and that you most want to share or remember while they're fresh in your mind?

16. Is there anything else about your dolphin interaction experience that you would like to tell me today?

APPENDIX B: SPECTATOR INTERVIEW QUESTIONS

1. Is this the first time you've seen a dolphin interaction?
    a. Probe 1 –Tell me about those other times.

2. Why did you decide to watch the dolphin interactions?
    a. Probe 1 –Do you know anyone that was interacting with the dolphins when you were watching?
    a. Probe 2 - (If yes) What is your relation to that person?

3. What did you think about the human-dolphin interactions?
    a. Probe 1 – How would you describe what was going?

4. People remember different things about experiences. What particular thing left an impression on you?

5. Sometimes people have an idea about these human-dolphin interactions before they actually see one up close. Now that you've seen them, how have your perceptions changed?

6. Thinking back over what you saw, what surprised you?

7. What kinds of things can people learn in these experiences?

8. Sometimes these interactions inspire people to do something related to dolphins when they get home. How about you? Are there things that you might do now that you've seen the dolphins here?
    a. Probe 1 – What do you think you might do?

9. Some people consider themselves to be an animal person; others, not really. Do you consider yourself to be "an animal person"?
    a. Probe 1 - Tell me more about that.

10. How about dolphins? Do you consider yourself a dolphin person?
    a. Probe 1 - Tell me more about that.

11. When I think of people who are birdwatchers, who love birds, I imagine that they would use natural methods of pest control in their gardens at home, in order to help protect birds. So suppose you had a friend who said, "I love dolphins and I care about them", what kinds of things would you imagine them doing in terms of conservation because they love dolphins?
    a. Probe 1 – Any other things?

12. Imagine a child back home asks you about swimming with the dolphins, what story would you tell them now that you've watched the experience?

13. I want to be sure that I got down what you meant in one of these earlier questions. When we talked about [fill in one of the topics], I've got down that you said _____. Did I get it right? Is there anything else you'd like to add to that?

14. Will you please write a postcard to a friend to tell about parts of the experience that were meaningful or important to you and that you most want to share or remember while they're fresh in your mind?

15. Is there anything else about your dolphin interaction experience that you would like to tell me today?

APPENDIX C: TRAINER INTERVIEW QUESTIONS

1. We're going to look at some video clips from the session where you were the trainer. Do you remember her/him? What do you remember about that particular interaction session? Can you tell me about it before we look at the video? Was there anything that struck you? Was it typical?
   a. Probe 1 – Was there anything out of the ordinary or that seemed different?

2. What kinds of things can people learn in these experiences?

3. How about the trainers? What are some things trainers can learn in the dolphin interaction sessions?

4. Sometimes people have ideas about human-dolphin interactions before they do them. Obviously you have a lot of experience with them now but, remembering back to before you started and your ideas then, how have your ideas changed since you've been involved in these dolphin interactions?

5. Have you had experiences that are similar to dolphin interactions before?
   a. Probe 1 - Tell me about them.

6. How long have you been doing the dolphin interactions?
   a. Probe 1 - What got you started?

7. Sometimes these interactions inspire people to do something related to dolphins when they get home. How about you? Have your interactions with dolphins inspired you to do something in your personal life?
   a. Probe 1 – What do you think you might do?

8. Examples of questions asked during video segments:
   a. Probe 1 - Tell me more about what were you thinking then? And now, what are your thoughts about it now?
   b. Probe 2 - What are your feelings about that now?
   c. Probe 3 – Tell me more about how was that typical/atypical?

9. Some people consider themselves to be an animal person; others, not really. Do you consider yourself to be "an animal person"?
   a. Probe 1 - Tell me more about that.

10. How about dolphins? Do you consider yourself to be a dolphin person?
    a. Probe 1 – Tell me more about that.
    b. Probe 2 – How about the visitors? Do you think most of them are "dolphin people" or consider themselves to be a "dolphin person"?

11. When I think of people that are birdwatchers, who love birds, I imagine that they would use natural methods of pest control in their gardens at home, in order to help protect birds. So suppose you had a friend who said, "I love dolphins and I care about them", what kinds of things would you imagine them doing in terms of conservation because they love dolphins?
    a. Probe 1 – Any other things?

12. There are a lot of different ways to organize these dolphin interactions in the water. What if, instead of a small group of people, it was just one guest, the dolphin, and you (the trainer)? How would it be different?

13. Following up on the last question, how might it be different if it had been just the guest and the dolphin, without a trainer?

14. Have you ever been in the water with the dolphins by yourself without the visitors?
    a. Probe 1 - How is that different?

15. Imagine you're in touch with a young relative about your job, what story would you tell them about swimming with the dolphins?

16. I want to be sure that I got down what you meant in one of these earlier questions. When we talked about [fill in one of the topics], I've got down that you said _____. Did I get it right? Is there anything else you'd like to add to that?

17. Will you please write a postcard to a friend to tell about parts of the experience that were meaningful or important to you and that you most want to share or remember while they're fresh in your mind?

18. Is there anything else about your dolphin interaction experience that you would like to tell me today?

APPENDIX D: ONLINE QUESTIONNAIRE QUESTIONS

The purpose of this study is to better understand adult participants' experiences in interactions with dolphins. Diane Sweeney, a doctoral student in education at the University of California, San Diego is conducting the research study at three zoological facilities for her dissertation. She is not being paid or receiving any financial support from any other dolphin facility for any aspect of this research. If you have any concerns about this research, you can contact Diane Sweeney at dlsweene@ucsd.edu. There will be approximately 60 participants and non-participant spectators that will be interviewed and perhaps 500 past-participants that will complete this online questionnaire in this study.

You have been asked to take part in this study because you have participated in dolphin interactions at one of the research sites. Your experience and perspective will be a valuable source of data for this research. We would greatly appreciate your participation but if you choose not to participate in the online questionnaire, there are no consequences of any kind to you.

There are **21** questions in the questionnaire and it takes about **15 minutes to complete**. At the end, please click on the Free Gift box to download a great new dolphin screen saver!

1. I am ready to begin the questionnaire.
   - Begin

   1a. Tell us about yourself.
   - Female
   - Male

2. Are you at least 18 years of age?
   - Yes
   - No.

   If not, you must have parent or guardian permission to participate in this questionnaire.
   Please have your parent or guardian state that she or he gives you permission to fill out this questionnaire, followed by her or his name and a phone number where we may call to confirm permission. Thank you.

   Enter Parent or Guardian Permission here: [ ]

3. When did you have your in-water interaction experience with the dolphins?
   - Within the past year
   - Longer than one year ago
   - I don't remember
   - I have not interacted with dolphins in a zoological facility.

   3a. Please enter the date of your program is possible. Date: [   ]

4. At which zoological facility did you have your in-water interaction experience with the dolphins?

   Company name and/or physical location: [   ]

5. What comes to mind when you think of your experience interacting with dolphins? [   ]

6. Have you had experiences that are similar to your dolphin interaction experience before?
   - Yes
   - No

   6a. Please explain: [   ]

7. What kinds of things can people learn in the dolphin interaction experiences?
   [   ]

8. There are a lot of ways to organize dolphin interactions. What if, instead of being part of a small group of people, it had just been you, the dolphin and the trainer?
   [   ]

9. Following up on the last question, how might your experience have been different if it had just been you and the dolphin, in comparison to you, the dolphin, and the trainer?

[ ]

10. What in this experience surprised you? [ ]

11. Sometimes people have ideas about interacting with dolphins in zoological facilities before they actually do it themselves. How have your ideas changed since interacting with the dolphins yourself? [ ]

12. What do you know now that you didn't know before you had this experience with the dolphins?

[ ]

13. What was your main reason for doing the dolphin interaction? [ ]

14. Some people consider themselves to be "animal people" while others don't really think of themselves that way. Do you consider yourself to be an "animal person?"
   - Yes
   - No

   14a. Why or why not? [ ]

15. How about dolphins? How would you describe your level of interest and involvement with dolphins?

[ ]

16. What kinds of conservation activities and behaviors would you expect people who care about dolphins to do? (Check all that apply)

	Yes	No
Carpool		
Combine errands in the car		
Use public transportation		
Keep the thermostat low in winter and high in summer		
Use energy-efficient light bulbs		
Limit garden water use		
Take short showers		
Buy only sustainable seafood		
Buy energy-efficient appliances		
Use natural methods of pest control in the garden		
Maintain a compost pile		
Do beach or stream clean-ups		
Recycle motor oil		
Recycle paper, plastic, & glass		
Donate to conservation organizations		
Write letters to policy makers on behalf of the environment		

Other: [   ]

17. Understanding that some respondents may not have cars, own a residence, or have a garden, of the 16 conservation activities listed in the last question that are relevant to you, how many do you do most of the time?
   - None
   - A few
   - About half
   - Most of them
   - All of them

   Comments: [   ]

18. Sometimes these experiences inspire people to do something related to dolphins when they get home. Have you been inspired this way?
   - Yes
   - No
   -
     18a. If yes, what? [   ]

19. Use the space below if there is anything else you'd like to tell us about your experience interacting with the dolphins.

[   ]

20. Would you be interested in taking a follow-up online survey or phone interview in the future to further assist with our research?
    - Yes
    - No

21. Please provide your contact information so that we may contact you for a follow-up survey and/or interview.

Name: [   ]

Email: [   ]

Phone: [   ]

Congratulations, you're finished! Thank you for completing this questionnaire. Your responses are very important in helping us better understand participants' experiences when they interact with dolphins. Click the Free Gift box to download a great new dolphin screen saver!

[Screen Saver Gift]

Additional Opportunity to Participate in a Follow-Up Study

If you would like to be considered for a follow-up interview by phone or a follow-up online survey, please read the sample **Informed Consent Form** below and indicate your willingness to sign such a form if you are selected for a follow-up interview by phone or a follow-up online survey in the future. Respondents for a follow-up interview or survey will be randomly selected from those who provide their contact information below. If your name is selected, you will be required to mail a signed consent form like the one below to the principal investigator. You will not be contacted again if you do not wish to be.

Coding Scheme for Analyzing Interview Transcripts and Questionnaire Responses

Primary Categories	Secondary Categories
Interest	• Feelings • Focus on/in the activity • Long-term impact
Knowledge	• Information about dolphin physiology and/or natural history • Information about zoological activities (training and care) • Information about conservation
Skills	• Observing • Asking and answering questions • Dolphin etiquette skills • Dolphin management skills • Visitor management skills
Reflections	• Relationship of science, politics, and personal beliefs • Self-reflections on learning • Connections to other experiences (individual, social)

Behaviors	• Intended stewardship behaviors
	• Other intended behaviors
	  o Greater awareness
	  o Education (self and other)
	  o Experiences (self and others)
	  o Personal life application
	  o Tell/share with others
	  o Decorate with a dolphin theme (jewelry, home décor, tattoo)
	• Reported stewardship behaviors

Attitudes	• Likes
	• Dislikes
	• Attitudes about animals
	  o Beliefs
	  o Empathy (caring)

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