Impacts of Educational Programming at Dolphins Plus on Visitor Knowledge, Attitude and Behavior

Carley Rice

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Impacts of Educational Programming at Dolphins Plus on Visitor Knowledge, Attitude, and Behavior

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Abstract

Zoos, aquariums, and similar institutions have been transitioning for many years from venues of entertainment to institutions of informal environmental education. This transition has led to these institutions claiming missions of conservation and education. The conservation education impacts of zoos and aquariums are not well understood. The literature is limited and at times inconclusive. Claims of conservation and education should be formally evaluated through survey research projects to determine validity. These types of studies will shed light on these institutions and aid in improving educational programs to best benefit conservation of wildlife, habitats and the environment. The purpose of this study is to evaluate the impacts of interactive, educational programs at Dolphins Plus on visitor knowledge, attitudes, and behaviors regarding conservation. An online survey project was designed and implemented to evaluate the impacts of the Dolphins Plus experience. A repeated-measures design was implemented. Visitors were surveyed prior to and shortly after visiting Dolphins Plus. The survey findings determined that visitor conservation knowledge increased post-visit. Changes in conservation attitudes were also seen. Visitors have a more positive view of viewing animals in captivity post-visit. It was also found that visitor self-efficacy regarding individual impacts on the environment decreased post-visit. Recommendations for future study include streamlining the timing of online survey invitations, automating the survey invitation process and omitting major design differences between the pre and post surveys. These methodological changes will address many limitations to this project.
It is also recommended that Dolphins Plus implement a third, follow-up survey to gauge long-term impacts and behavioral changes.
Chapter 1 – Introduction

The purpose of this study is to evaluate the impacts of recreational swim with dolphins experiences at Dolphins Plus on participants’ knowledge, attitudes, and behaviors regarding natural resource conservation. Dolphins Plus is a commercial dolphinarium located in Key Largo, Florida, with a mission to promote marine conservation through its programs. Currently, knowledge regarding the impacts of programming at zoos, aquaria, and similar venues of informal environmental education is limited, yet many of these institutions have mission statements that include education and conservation. (Carr and Cohen, 2015) (Packer and Ballantyne, 2010)

Studying these impacts is a relatively new idea without an extensive body of prior knowledge (Mariano et al., 2010), but in recent years the field has been expanding. More studies are being done that look at venues of informal environmental education and evaluate their impacts on visitors, particularly with respect to natural resource conservation. These types of studies are both academic and practical and can shed light on the role of the informal sector in environmental education, the validity of claims by facilities regarding their impacts on conservation, and how these institutions can improve their programs to benefit conservation of wildlife, habitats and the environment.

This study will serve as a pilot study to inform and guide a larger scale, more extensive project to be completed by Dolphins Plus in the near future. Originally this project was intended to serve as a formal, full-scale project evaluating the impacts of visiting Dolphins Plus on visitor conservation knowledge attitude, and behavior. Time constraints and other challenges changed the scope of this study to serve as a pilot study. This project will use a repeated measures design. Visitors will be asked to complete a survey, via online survey platform Survey Monkey, prior to and following their visit to Dolphins Plus. This repeated-measures design will allow for comparison of pre-visit and post-visit knowledge and attitude. The Pre-Swim survey will be sent to all visitors to Dolphins Plus at the time of online registration for a program. The Pre-Swim survey will also be sent retroactively to any visitors currently registered for a future program. Following the visit to Dolphins Plus visitors will receive via email the Post-Swim survey. The Post-Swim survey will be sent out to all Pre-Swim survey respondents at least 10 days after the program date and no more than 3 weeks following the program date. The timing of survey implementation will be discussed in detail in the methodology chapter.

1. Significance of Study

Zoos and aquaria have been transitioning for many years from venues of entertainment to institutions of informal environmental education. As they have done so, these institutions are also facing backlash from sectors of the general public and the media for placing animals in captivity and controversy about animal rights and ethics.
Concern for animal welfare has recently inspired evaluation of the function and purpose of zoos and aquaria as well as their purported effectiveness at promoting conservation. (Mason, 2000)

Studying the connection between informal education and visitor conservation knowledge, attitude and behavior is a relatively new field of study; the current information on the topic is limited and at times inconclusive. Claims about the positive impacts of informal education should be studied and evaluated to more fully understand the nature of the impacts of educational programming at zoos and aquaria. (Mariano et al., 2010) As Carr and Cohen (2011) state, “The contemporary justification for zoos is based on their ability to act as sites of wildlife conservation.” (p.175) This ability must be tested and evaluated not only to address ethical issues, but also to better understand the role and effectiveness of the informal sector in environmental education and change. The outcome of this project will provide insight to this issue by exploring how programming at Dolphins Plus may aid marine conservation efforts by impacting visitors’ knowledge, attitudes, and behaviors. The results of this study will also add to the greater body of work evaluating the impacts of zoos, aquaria, and similar institutions in relation to conservation education.

The study also has practical significance. Dolphins Plus researchers are looking to better understand the impacts of informal educational programs, such as swim-with-dolphins programs. This project is sponsored by Dolphins Plus. My contribution was included through an internship program with Dolphins Plus. Dolphins Plus began this project to better understand their programs and be able to potentially validate their conservation and education missions. My contribution to the project is serving as a pilot study. This pilot study will inform Dolphins Plus of the impacts of their visitor’s experience and allow them to improve the design and implementation for the future, long-term study. The future study will again be a repeated-measures design. The main difference from the current study will be the implementation of a third, follow-up survey to gauge long term effects on knowledge, attitude, and behavior.

Findings of the current, pilot study will provide Dolphins Plus with a more complete understanding of the strengths and weaknesses of their programming. Insight from this study can be used to improve programming at Dolphins Plus. This insight can also benefit similar institutions by providing a guideline for evaluating and improving swim-with-dolphins programs to better aid conservation efforts. Similar institutions, such as aquariums and dolphinariums will be able to design a similar survey project, using this pilot study as a guideline. To maintain credibility, it is important for zoos and aquaria to evaluate and understand the impacts of informal education programs on visitors. Some zoos and aquaria claim that their educational programs have a positive impact on visitor knowledge, attitude and behavior, in relation to conservation. (Falk et al., 2007) These claims should be formally evaluated through survey research to fully understand the visitor experience.
2. History of Environmental Education in the US

Environmental education exists in two contexts, formal and informal. Formal education occurs in school, following a specific curriculum, taught by a teacher. Formal education is generally structured, evaluative, planned and compulsory. Informal education occurs outside of the classroom, in more informal settings such as museums, nature parks and reserves, and zoos and aquariums. Informal education is more unstructured, unplanned, open ended, learned centered and voluntary. Informal education is considered a form of free-choice learning. “Free-choice learning is the single most dominant form of learning. Free-choice learning is the learning people control what to learn, when to learn, where to learn, and with whom to learn.” (Hodak, 2008, p.1)

Both formal and informal environmental education can positively impact environmental literacy. Formal, classroom learning is not always enough; informal environmental education may be needed to fill gaps and contribute to environmental literacy. (Erdogan, 2015) Zoos, aquariums, and dolphinariums are venues of informal environmental education. These institutions, including Dolphins Plus, can benefit from the growing body of knowledge pertaining to the benefits of informal environmental education. Stocklmayer et al (2010) evaluated the roles of both the formal and informal sectors on science education:

“The ways in which science presents itself informally to a broad public are rich and varied. There are museums and environmental centres, clearly focused on portraying aspects of science…Without doubt, the science is there to find, if the seekers know how to find it and can understand it when they do. The problem with many of these opportunities for learning is that personalised learning outcomes are very difficult to measure, so, we have little idea how often, or in what way, they are accessed.” (p. 11)

Evaluating the impacts of informal education is a challenge that needs to be addressed to better understand how people are learning and how they are being affected. Venues of informal education, such as zoos and aquariums, often claim benefits that have not been formally tested or evaluated. Most zoos and aquariums claim missions of conservation education but do not have the data to back up these claims.

Environmental education is a somewhat new development and has been evolving rapidly in recent decades. It was around the same time period that zoos and aquariums began the shift from menageries with the goal of entertainment, to venues of informal education with goals of conservation. The Tbilisi Declaration in 1978 brought forth the idea that environmental literacy should be a goal of the formal education system. The Tbilisi Declaration is one of the first major moves made regarding environmental education on a global scale. The declaration was written during a UNESCO conference on Environmental Education and stated the need for formal and informal environmental education, or EE, opportunities for children as well as adults.
The Declaration also recommended that member states integrate EE into general policy and create a specialized environmental education unit. The declaration recognized anthropogenic impacts on the natural world and called for EE at all levels of education. This was the beginning of the movement that we see today pushing for the development and growth of environmental education. (UNESCO, 1977) In the US, eight years before the Tbilisi Declaration, another milestone in environmental education occurred. The North American Association for Environmental Education (NAAEE) began in 1970 with its inaugural annual conference. The NAAEE is a national organization dedicated to promoting and supporting environmental education and working with partners across the country to promote environmental literacy for all citizens. (naaee, n.d.)

In 1993, the NAAEE began the National Project for Excellence in Environmental Education, which developed guidelines and standards for EE programs across the country. Ruskey et al., 2005, surveyed the status of state level environmental education to gauge which states were providing informal educational programs and to what extent. The goal was to provide baseline data in hopes of one day achieving nationwide environmental literacy. This was followed up by a second survey of the same nature in 1998 to gauge the progress over the three-year time span. The 1995 survey found that EE existed in most states in some informal capacity, but there was little incorporation into formal education found at that time. By 1998, EE capacity building was becoming a nationwide trend. In the span of three years, 93 state-level EE programs had been developed. (Ruskey et al., 2001)

In 1999, the US EPA identified funding of EE capacity building as a focus of the EPA’s National Environmental Education Training Program. (Kirk et al., 1997) (Ruskey et al., 2001) The rapid growth of EE in the 90’s could be partially due to the National Environmental Education Act of 1990. This act stated that “it is the policy of the US to establish and support a program of education on the environment.” It also established an official office of environmental education to develop and support programs, seminars and training opportunities for educators. (Public Law 101-619) In the years since, EE has continued to evolve and gain support. Educational programming at zoos and aquariums can benefit from this evolution of general environmental education. As venues of informal EE, zoos and aquariums, can take advantage of seminars, training programs, and other resources available for environmental educators.

NAAEE guidelines for environmental education inspired many states to use the guidelines to form an Environmental Literacy Plan, or ELP. Ruggiero (2016) conducted a study to evaluate the environmental literacy plans currently in place throughout the 50 states to provide baseline data for future analysis of the progress of EE programs in the US. She states, “In response to the lack of formalized environmental education in the United States, 48 states are in the process of developing Environmental Literacy Plans (ELPs) through their state environmental education organization (SEEO). The North American Association of Environmental Educators (NAAEE) produced guidelines intended to inform the states writing and development of their ELP. These guidelines provide a framework for the integration of environmental education into current state curricula, propose graduation requirements for environmental literacy, suggest steps for teacher professional development, detail assessment strategies and propose funding.
sources and policy action steps.” These plans are not nationally enforced and do not address informal EE but are meant to organize and unify EE efforts in formal education at the state level. (Ruggiero, 2016).

This section will discuss the history of environmental education in the state of Florida. Dolphins Plus was created in Florida and their two locations still reside in Key Largo, Florida. Having a better understanding of EE in Florida may add insight to this study. Dolphins Plus views itself as a venue of education and therefore should be evaluated as such. The first Environmental Education Act in the state of Florida was created in 1970 and dismantled in 1981. (Monroe et al., 2006) That same year environmental education in the state of Florida saw a major milestone with the establishment of the League of Environmental Educators in Florida, or LEEF. LEEF is a non-profit professional organization for environmental education in Florida and is an affiliate of the NAAEE. The goals of LEEF include advancing environmental literacy and promoting stewardship at all levels of education, promoting the use of research based environmental education, highlighting emerging trends in the field, and increasing content knowledge of educators. LEEF collaborates with many local organizations and with surrounding states through the Southeast Environmental Education Alliance. LEEF is also currently involved in working on the Florida Environmental Literacy Plan. As mentioned previously, the NAAEE provides guidelines for states to develop ELPs. In addition, LEEF provides professional networking opportunities, workshops, events, grants for educators, and annual conferences. (leef-florida.org)

From 1989-2003 the Florida Advisory Council for Environmental Education (ACEE) funded 178 EE programs in the state. This grant program was organized by ACEE and the Florida Fish and Wildlife Conservation Commission (FWCC). A study by Monroe (2006) evaluated the grant program. The study found that the grant program increased diversity of EE programs in Florida, increased diversity of agencies providing EE programs, and allowed for more extensive programs. In 2000, budget cuts led to a disproportionate cut to EE grants and a reduction to all programs. Lack of funding caused the FWCC to call for the elimination of the program. (Monroe et al., 2006)

Environmental Education in the United States is a relatively new concept. Over the past 4 decades EE has evolved greatly from a relatively unknown concept. These past decades have seen legislation at both the state and federal level pertaining to EE. Numerous organizations now exist to support and promote environmental literacy in the US. These organizations include the NAAEE at the national level and LEEF at the state level in Florida. These gains in the field of EE can also benefit and inform programming at zoos, aquariums, and dolphinariums. Places like Dolphins Plus fall into an interesting and unique sector of EE. They are both venues of entertainment and education. Zoos and aquariums began as menageries with no focus on education or conservation. They were purely entertainment oriented. As the US has begun to develop EE goals and programs, zoos and aquariums have also been shifting their focus and their missions to include education. These institutions have the unique ability to both entertain their visitors and take advantage of recent developments in EE to inform visitors and promote environmental literacy.
3. Scope of Work

This project is being conducted to answer the following research question, “How does a swimming-with-dolphins experience at Dolphins Plus affect visitor knowledge, attitudes, and behaviors regarding natural resource conservation?” This question was explored through the implementation of a repeated-measures, internet-based survey. This project served as a pilot study to inform a future, long-term study to be conducted by Dolphins Plus in the near future. This project was initially designed, proposed, and sponsored by Dolphins Plus. Dolphins Plus is looking to understand their visitor experience and hoping to validate their conservation and education missions through their findings. The scope of the study was constrained by the goals and intentions of Dolphins Plus but was evaluated for bias throughout the project. My contribution with this project was evaluated by my graduate committee for bias and construct validity. The input of myself and my committee was taken into consideration and modifications to the survey design and implementation were made where necessary.

Research Methods

This study utilized a repeated-measures design. Visitors were surveyed prior to and shortly after their visit to Dolphins Plus. The surveys were implemented using an online platform, Survey Monkey. Survey invitations were sent to recipients via email address that was provided to Dolphins Plus at the time of booking a program. The surveys were sent to the individual who made the booking on the Dolphins Plus online reservation system.

This study was conducted during the summer of 2017, beginning on June 22, with the first Pre-Swim survey invitation. The study was concluded on August 12, with the final Post-Swim survey reminder prompt. The total study duration was just over 8 weeks.

Study Site

Dolphins Plus is a for-profit, recreational dolphinarium located in Key Largo, Florida. Dolphins Plus has two current locations where it offers swim with dolphins experiences to its visitors. The Bayside facility is located on the Gulf of Mexico. The Oceanside facility is located on a canal adjacent the Atlantic Ocean. Figures 1 and 2 provided below show photographs taken from Google Earth, of both the Bayside and Oceanside facilities.
Figure 1.1. Google Earth image of Dolphins Plus- Bayside location

Figure 1.2. Google Earth image of Dolphins Plus- Oceanside location (Dolphins Plus Marine Mammal Responder)
Dolphins Plus claims marine conservation in their mission statement: “We are committed to providing guests with the chance to interact and share unforgettable moments with dolphins to foster a greater appreciation for our oceans, the creatures that inhabit them, and the importance of marine conservation.” Dolphins Plus currently only has Bottlenose Dolphins in their care. All animals in their care were born in captivity, many at Discover Cove in Orlando, Florida. These marine mammals are not endangered and are classified as a species of least concern by the IUCN. (Tursiops truncatus, 2017) The animals are kept in marine enclosures. Enclosures and both facility locations are connected to a natural, waterway and are therefore subject to natural functions of the ocean, including temperature and tidal fluctuations. Dolphins Plus claims animal wellbeing, and welfare to be of high priority. Dolphins Plus holds memberships and certifications with multiple associations dedicated to animal welfare. Dolphins Plus is a member of the Alliance of Marine Mammal Parks and Aquariums. AMMPA membership provides Dolphins Plus with up-to-date methods of marine mammal care. Dolphins Plus is also a member of the International Association of Marine Mammal Trainers. This allows Dolphins Plus to have access to new training dolphin training techniques. Dolphins Plus also claims to operate under the following federal and state level regulations, including the Marine Mammal Protection Act of 1972. These accreditations and regulations ensure that Dolphins Plus is operating in a lawful manner that is placing dolphin health and wellbeing above all else. (Dolphins Plus, n.d.)

- United States Department of Agriculture’s Animal Plant and Health Inspection Service
- National Marine Fisheries Service
- National Marine Fisheries Service Marine Mammal Stranding Network
- Drug Enforcement Agency (DEA)
- United States Core of Engineers
- Occupational Health and Safety Administration (OSHA)
- HAZMAT Certified
- HAZWHOPER Certified
- Department of Environmental Protection
- Florida Department of Environmental Regulation
- Marine Mammal Protection Act of 1972
- Convention of International Trade of Endangered Species

Dolphins Plus is not an aquarium or marine mammal park (such as Sea World) where marine mammals are exhibits; its recreational activities consist of a short educational orientation and several interactive swim with dolphins activities. Dolphins Plus also conducts independent research with their animals and offers educational opportunities such as camps for children and internship programs for college students. (Dolphins Plus, n.d.)

Dolphins Plus offers a variety of different interactive programs. The most popular are the Structured Swim and Shallow Water Experience. The Structured Swim is a deep-water experience where guests interact with the dolphins. The dolphins complete a
variety of behaviors with the visitor, including dorsal tows, handshakes, and bows over hoops and poles. The Shallow Water Experience is a waist-deep interactive program that includes experiencing dolphin behaviors such as body rubs, handshakes and kisses.

Both programs, and all others offered, begin with a thirty-minute educational and informational orientation. This briefing includes information regarding general marine mammal biology and ecology focused on whales and dolphins. It also includes information regarding whale and dolphin conservation, dolphin anatomy and rules for the impending program. The content of the briefing program has recently been updated at both Dolphins Plus facilities to provide a more conservation-focused message. This study hopes to evaluate this new briefing format for its effectiveness. (Dolphins Plus, n.d.)

4. Role as A Pilot Study

This project is a pilot study. Dolphins Plus will continue the project after it is finished, and use insights obtained from the study to design a repeated measures study that includes a pre-visit survey and two post-visit surveys over a period of several months. Thus, in addition to exploring the effectiveness of Dolphins Plus programs, we will also evaluate lessons learned from the survey design and methodology. Following the completion of the pilot study, recommendations will be made to improve the survey design and overall project implementation. This pilot study will not only give Dolphins Plus an initial look at the potential impacts of their programming but will also provide insight into how to improve the study for continuation of the project.

Pilot studies in social science research are conducted to evaluate the feasibility of a study. They can be used as a small-scale trial run to prepare for a larger, future study. They can also be used to pre-test a particular research instrument for use in future research. Conducting a pilot study or numerous pilot studies before beginning a major research project can serve numerous functions. A pilot study can give researchers advance warning to where the future project could potentially fail. A pilot study can also identify potential problems with the research procedure. Following the completion of a pilot study, new methodology may be recommended. In survey research in particular, a pilot study can evaluate respondent’s reactions to certain questions styles and collection methods. This information can then be used to aid in improving the survey design and administration. (Teijlingen and Hundley, 2001)
Chapter 2 – Literature Review

This chapter includes an in-depth discussion of zoos, aquariums, swim with dolphins programs and their conservation and education missions. This chapter begins with a section regarding zoo and aquarium conservation missions. Information obtained from The World Association of Zoos and Aquariums (WAZA) and the Association of Zoos and Aquariums (AZA) pertaining to zoo and aquarium missions opens the section. The first section begins with a study conducted by Patrick et al. (2007) that analyzed the purposes of zoos and aquariums and compared those purposes with their mission statements. The section then reviews recent literature pertaining to zoo and aquarium conservation and education missions. These studies evaluate the potential conservation and education impacts of zoos and aquariums. All studies reviewed with the exception of one were published in the past two decades. This literature includes a study conducted by the AZA and is one of the most widely cited publications in the zoo and aquarium community. The purpose of this section is to introduce past studies evaluating zoo and aquarium conservation education impacts and describe the need for future study.

The second section of this literature review pertains to informal environmental education. This section begins by defining environmental education and stating the need for environmental education to impact our values, beliefs, attitudes and behaviors regarding the environment. This section then goes on to define these philosophical terms and review literature analyzing how informal environmental education programs can potentially alter human values, beliefs, attitudes and behaviors regarding the environment. It concludes with the idea that zoos, aquariums and similar institutions can potentially be important venues of informal environmental education.

The final section of this chapter pertains to swim with dolphins programs (SWD), their function and their possible impacts regarding conservation education. The literature evaluating SWD programs is limited and relatively recent. Miller et al. (2013) informed this study and provided useful guidance for the study purpose and methodology.

1. Zoos, Aquariums, and Natural Resource Conservation

As time has progressed, zoos and aquariums have evolved from menageries to places of education. (Packer and Ballantyne, 2010) The first recorded zoo in history was a palace menagerie in 15th century Egypt. Egyptian royalty kept collections of wild animals as symbols of wealth, power and indulgence. (Coe, 1986) Other ancient civilizations, including the Chinese and Romans kept similar collections. Modern zoos followed in Europe in the 18th century. The first zoos came to the United States in the 1870’s. (Mason, 2000)

Historically, zoos and aquariums have had many roles, primarily entertainment. (Packer and Ballantyne, 2010) Even thirty years ago many zoos were focused on entertainment rather than education. Zoos have long been important to the tourism industry, but zoo structure and function have changed dramatically over recent decades.
This transition is partly due to a recent increase in concern over animal welfare. The public is beginning to recognize animal rights and is becoming increasingly uncomfortable with the idea of captive animals in “stark cages.” Some individuals are opposed to seeing animals in captivity while others are skeptical of the conservation efforts of zoos. This unfavorable opinion of zoos is putting pressure on zoos to provide evidence of their conservation impacts and back up their claims of successful conservation and education projects.

The creation of the first zoological societies in the late 18th century sparked the shift from menageries to zoos with an emphasis on science. This shift would be decades in the making. Zoos had little emphasis on animal welfare or conservation until relatively recently. This transition is due in part to an increasing awareness of issues pertaining to captive animals and animal welfare. Today zoos claim to exist not solely for the purpose of human entertainment but to aid conservation efforts and educate the public. The recent focus of zoos on conservation can be attributed to heightened public awareness of environmental degradation. Miller et al, 2003 states that “Collection-based institutions became interested in conservation issues during the last four decades, as society became more aware of losses to nature.”

There is little known about the nature of zoos as tourist attractions or about the characteristics of zoo visitors. Mason (2000), states the need for further research analyzing the nature of zoos, visitor experience, zoo marketing and zoo impacts on the environment, the economy and society. Such studies could investigate the ethics behind captive animals, the education role of zoos, the potential redundancy of zoos, the possibility for zoos to inspire interest in wildlife and to promote environmental awareness. (Mason, 2000)

Many modern zoos and aquariums include conservation and education in their mission statements. These mission statements guide the operation of the zoo according to goals set by the facility. One requirement for accreditation by The Association of Zoos and Aquariums (AZA) is that the institution provides a copy of the stated purpose of the zoo or aquarium. This is generally in the form of a mission statement. According to Patrick et al (2007) “These statements ensure that organizational designs, culture, and operations promote ecological values, conservation, and education.” A study conducted by Patrick et al (2007) evaluated and analyzed the mission statements of 136 AZA-accredited zoos. The study looks at the purposes of zoos in comparison to their stated purposes found in their mission statements. The study found that the vast majority of the mission statements included language about both conservation and education. Only 33% of mission statements included the theme of education in direct relation to conservation. Patrick et al concluded that, “Zoo mission statements do not convey how zoos will develop lifelong knowledge of conservation or affect the awareness, attitudes, and behaviors of people toward natural resources. However, zoo mission statements do promote education by stating that zoos will provide information about species and their natural habitats.” (Patrick et al., 2007)

The World Association of Zoos and Aquariums (WAZA) name both conservation and education as part of their vision. WAZA states that their goal is, “...to guide,
encourage and support the zoos, aquariums and like-minded organisations of the world in animal care and welfare, environmental education and global conservation.” WAZA is comprised of over 300 members, including zoos, aquariums, associations, affiliate organizations and corporations. WAZA is also a founding member of the International Union for Conservation of Nature (IUCN). The promotion of education, conservation and research is stated as one of their main areas of focus. WAZA states that, “The world zoo and aquarium community has the largest potential conservation network globally.” They not only claim conservation potential but define conservation of global biodiversity as a responsibility of the zoo and aquarium community. Both ex-situ and in-situ conservation are mentioned as priorities by WAZA. WAZA periodically issues conservation strategy publications detailing current and future conservation goals, plans and practices. (WAZA, n.d.)

The Association of Zoos and Aquariums (AZA) is similar to an American equivalent to WAZA. AZA is “a 501(c)3 non-profit organization dedicated to the advancement of zoos and aquariums in the areas of conservation, education, science, and recreation.” AZA represents over 230 institutions both in the US and internationally. These institutions attract over 183 million visitors per year and dedicate millions of dollars to support research, conservation and education programs. AZA-accredited zoos and aquariums spend $160 million each year on field conservation projects. One area of focus is on the conservation of threatened and endangered species. The AZA Species Survival Plan (SSP), is described as “a cooperative animal management, breeding and conservation effort that works to ensure genetically diverse, self-sustaining populations of more than 500 species of animals.” AZA states that there is growing evidence to support the claim that zoos and aquariums are effective at connecting visitors to the natural world and providing science education. (AZA, n.d.)

Miller et al., (2004) conducted a study to show that it is vital to evaluate actions taken by zoos and other collection institutions in regard to their conservation missions. Recent years have seen many zoos include conservation in their mission statements. Miller and his team state that if zoos claim a conservation mission they should be expected to prioritize that goal and allocate resources to that goal. The study asked a set of questions dealing with how zoos are or are not effectively contributing to and prioritizing conservation. authors state that, “…without evaluation, it will be hard to learn from experience and improve performance.” They hope that the study can aid zoos, similar institutions and community members to think about and support the conservation missions and efforts of these institutions. The study concluded that zoos and similar institutions should be held accountable for their conservation missions. They state that conservation plays a major role in the viability of zoos today with increasing public concern over animal welfare in captivity.

Impacts of Educational Efforts

The shift from a mission of entertainment to one of education and conservation has inspired studies of the impact of education at zoos and aquariums. It is a relatively new field of interest. As the public becomes increasingly concerned for the welfare of animals in captivity, studies are being conducted to evaluate the purpose and function of zoos as potential venues of conservation education. (Mason, 2000) As previously stated,
recent decades have seen an increase in public discomfort with the concept of captive animals. (Carr and Cohen, 2011) This discomfort is due to an awareness of animal welfare due in part to the animal rights movement. This social and cultural movement in the US saw its origins in the 19th century. The American Society for the Prevention of Cruelty to Animals was founded in 1866. The movement truly emerged in the 1970’s with the animal equality, or the idea that animals, like humans possess certain unalienable rights. The fight for animal rights has now transitioned from a fringe movement to a mainstream effort. This has in turn brought issues of animal rights and welfare to the attention of the general public, instigating a concern over animal captivity. (Guither, 1998)

An article published by DeRosa (1985) summarized a study conducted two years earlier by Swenson (1983). Her study assessed the educational impact of zoos. Four zoos were selected, ranging from a poorly kept menagerie to the San Diego Animal Park. White, adult visitors were chosen as the study sample population. The visitors were given a knowledge-based pre-test prior to their zoo visit and a post-test following their visit. The results concluded that there was no increase in knowledge pre to post-visit. The study found that visitors tended to ignore educational and interpretive information and were focused on entertainment and recreation. The author suggested that to ensure a better experience, a teacher may be needed to play an active role in educating their students while on school field trips. (DeRosa, 1985) This study had no mention of conservation, suggesting that conservation education is a new field.

A 2003 study surveyed visitors at Zoo Atlanta to determine the effects of public animal training and oral interpretation at an otter exhibit. The study was focused on visitor experience as well as learning. The authors state that, “The present study sought to extend previous research on visitor behavior and perceptions by evaluating the effects of oral interpretation and public animal-training sessions as enhancements to the zoo environment.” A questionnaire was implemented to assess visitor knowledge and attitudes in order to provide insight to effectively entertain and educate zoo visitors. The study found that active engagement with the animals along with interpretation produced a better zoo experience. A better zoo experience constituted of an enjoyable, educational experience along with positive perceptions of the facility, staff, exhibit, training program, and the animals themselves. The study also found that visitors viewed the exhibits for longer periods of time during active training sessions with interpretation versus without interpretation. They suggest further study needs to be done to better understand how to best entertain and educate zoo visitors. (Anderson et al., 2003)

A 2007 study by the Association of Zoos and Aquariums (AZA) titled “Why Zoos Matter,” looks at the impacts zoos and aquariums have on visitor’s conservation-related knowledge, attitude and behavior. It was one of the first major studies of its kind. The AZA conducted the study to see if zoos and aquariums promote conservation successfully and to use their findings to improve visitor learning experience. The study claims that past literature on the subject has been insufficient. Direct impacts on visitor conservation-related knowledge, attitude and behavior is not fully known or understood. Falk states that, “…much of the earlier research had been limited in scope and in ways that did not allow the results to be applied generally across all leading zoos and aquariums.” (Falk et al., 2007)
The AZA conducted a three-year, nation-wide survey project to evaluate the impacts of educational programming at zoos and aquariums. The study showed a positive impact of educational programs on the conservation knowledge, attitude and awareness of zoo and aquarium visitors. They state that zoo and aquarium visitors leave with increased awareness regarding their role in environmental problems. Other results include an increased connection to nature and reinforced values and attitudes. (Falk et al., 2007) The AZA president states that, “For the first time we have reliable data validating the positive impact zoos and aquariums have in changing visitors’ feelings and attitudes about conservation.” (Mariano, 2010) The AZA study has provided a starting point for other studies of its kind.

This study is widely cited in the zoo and aquarium community to validate their missions but has faced recent critique and criticism. A 2010 study analyzed the methods of the Falk et al (2007) study. Mariano (2010), regarding the AZA study states that, “The authors’ stated goal was to assess whether zoo and aquarium experiences affect visitors’ beliefs and knowledge. With regard to knowledge, however, Falk et al. assessed only what responders said they believed or understood; they administered no direct measures of knowledge. There is a copious literature on the inaccuracies associated with self-report measures.” This is a major conceptual flaw in the study design and outcome. This study also cites major threats to validity and found issues in the legitimacy of methods used by Falk and his team to collect and analyze their data. One threat to validity found in the AZA study is poor experimental control relating to either construct validity or internal validity. For example, a response bias was found in the AZA study, indicating that survey responses were influenced by the test instrument itself rather than the subjects’ beliefs. The survey design was also flawed. The study utilized a pre-post design, but the pre-test was done retrospectively. The entire survey was conducted post-visit. This method tends to overestimate program effects. Mariano (2010) concludes that further study is needed to legitimize the claims made in the AZA study. “We also encourage further research that addresses the methodological threats to validity that we have identified.” (Mariano, 2010)

Nickels (2008) used methodology suggested by Falk et al. to conduct a similar study at the Oregon Coast Aquarium looking at the impact of education on visitor conservation attitudes. The study showed that visitor conservation attitudes increased from pre-visit to post-visit. They suggested utilizing a follow up study for more comprehensive results. (Nickels, 2008) A more recent study, published in 2012, looked at the impacts of dolphin shows and interaction programs on visitor conservation knowledge, attitude, and behavioral intentions. The study found dolphin shows and programs to be beneficial for knowledge, attitude and behavioral intention. This study utilized a follow up survey and found that knowledge was retained, and an increase in conservation behavior had increased as well after three months’ post visit. (Miller et al., 2012)

A 2008 study evaluated the impacts of a residential informal environmental education program on connection with nature, environmental stewardship, and interest and awareness of biodiversity. This study found both short and long-term benefits of environmental education. A survey was given directly following the program and then again three months later. Past literature suggests that follow up information looking at
long term impacts of informal environmental education is uncommon. (Stern et al., 2008) Future research evaluating the impacts of zoos and aquariums could include follow-up surveys to add clarity and additional information to the body of literature.

Packer and Ballantyne (2010) suggest that zoos and aquariums can be important venues of environmental education for adults. They conducted a study to evaluate the success of conservation education programs on visitors to zoos and aquariums. They found that 39% of respondents were able to state new knowledge gained from their visit, 5% reported questioning their values or changing their personal attitudes post-visit, and 7% reported participating in new environmental actions and behaviors. (Packer and Ballantyne, 2010)

The literature regarding the impacts of zoo and aquarium conservation knowledge, attitudes, and behaviors indicated that the evaluation of impacts is a relatively new field, in need of study in need of ongoing research. The majority of zoos and aquariums are now claiming to have both conservation and education impacts, yet. The literature suggests that these potential impacts have yet to be proven and should be evaluated. Such valuation can aid zoos and aquariums to better their practices and programs regarding conservation and education.

Recent studies have shown zoo, aquarium, and other informal environmental education experiences to have some positive impacts regarding knowledge, attitudes and behaviors regarding conservation. These studies do exhibit some positive findings but are also at times inconclusive and in need of further investigation. One of the most widely cited studies evaluating zoo and aquarium impacts is the AZA study conducted by Falk et al (2007). The study concluded that zoos and aquariums are significantly impacting visitor knowledge, attitudes, and awareness regarding conservation. The findings are less meaningful due to major threats to validity and methodological flaws. (Mariano, 2010) Nickels (2008) conducted a study at the Oregon Coast Aquarium that showed positive results including an increase in conservation attitudes. The findings were significant, but the study utilized methodology suggest by Falk et al (2007) that were described as flawed and invalid. (Mariano, 2010) The Zoo Atlanta study concluded that interpretive, animal training programs lead to a “better zoo experience.” This study did show that visitors have a more enjoyable, educational zoo visit when observing interpretive programming but failed to evaluate conservation impacts. Packer and Ballantyne (2010) conducted a study evaluating zoo and aquarium impacts that produced conclusive and valid results. They found that conservation education programming and zoos and aquariums increased visitor knowledge, inspired value and attitude changes, and lead to new environmental behaviors. Most studies reviewed for this project included some level of ambiguity and called for further research to better understand zoo and aquarium impacts.

One commonality among the research is a call for more research and additional follow up studies. Most studies reviewed utilized a repeated measures design, evaluating visitor knowledge, attitudes, and or behavior prior to and after their zoo or aquarium experience. The AZA study theoretically utilized a pre-post design but, implemented their pre-survey retrospectively, creating issues of validity. Stern et al (2008) conducted a study evaluating the impacts of a residential informal education program. The program evaluated participant knowledge, awareness, connection to nature and commitment to
environmental stewardship. Stern found that the program led to short and long-term improvements in all areas analyzed. This study, even though not conducted at a zoological facility, demonstrates the benefit of utilizing a follow-up survey. Certain gains had begun to fade after 3 months, but knowledge and commitment to environmental stewardship remained. This methodology can be used in studies evaluating zoo and aquarium educational impacts to add insight and create better understanding of program impacts. Immediate knowledge gain and attitude change is important but will not lead to true behavior change if the changes are not retained in the long-term. If zoo and aquarium impacts are sustained it is possible that these institutions may be able to truly impact conservation through education.

2. Environmental Education and the Informal Sector

As the previous section indicates, the mission of zoos and aquariums has shifted over time from entertainment and recreation to the education of visitors, wildlife conservation, and resource stewardship. These institutions are now directly involved with environmental education and a new field of study has emerged to assess the effectiveness of their efforts. One issue that must be addressed is whether or not environmental education conducted by the informal sector has a role to play in environmental education and its benefits generally.

Stapp is one of the earliest researchers to publish about environmental education and define the term. Stapp states that, “Environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution.” (Stapp et al., 1969)

Stapp asserts environmental education as a way to re-connect with the natural world and increase environmental awareness. He states four main objectives of environmental education. The first, fundamental objective is to understand that man is part of a greater relationship between human culture and the natural environment. Understanding our role in impacting the natural world is vital. Second, it is important to understand the biophysical environment and the role it plays in society. A third objective is to understand current environmental problems, how to solve these problems, and the responsibilities of the general public and the government in solving them. Lastly, he states the need for people to adopt attitudes of concern for environmental quality. Concern for the environment is one driving factor in motivating citizens to participate in solving environmental problems. (Stapp et al., 1969)

Environmental education, put simply, is about creating a population of environmentally literate citizens. Environmental literacy is a term to describe the state of being knowledgeable about environmental issues, being skilled in protecting the environment, being positively affected towards environmental issues and behaving in a way that is environmentally responsible. Many studies state environmental literacy as an expected outcome of environmental education. (Erdogan, 2015)
Research and theory has shaped the expectation that environmental education will increase environmental knowledge and awareness, which will in turn lead to positive attitudes and responsible behavior. In recent years, studies have been published evaluating the effectiveness of environmental education programs and influence on knowledge, awareness, attitudes, values, and behavior. (Oztas, 2015) These concepts, however, can be philosophical in nature and complex to define.

Papadakis (2001) states that, “Beliefs reflect assertions about what is real in the world.” They represent perceptions of what is true about the world around us. Our beliefs can be difficult to change through exposure to new information. It is possible to alter beliefs but generally requires cognitive dissonance. Years of life experiences can also eventually change once held beliefs. Beliefs influence all that we think and do and are a fundamental part of who we are. (Papadakis, 2001)

Value, as it is used within environmental education, can have two different meanings and is context dependent. Value can refer to having an appreciation for something, such as nature. This is a psychological definitions which refer to human satisfaction, enjoyment and attitude towards an object. There are also social definitions. One social definition of value is, “…the object for socially approved ideals or purposes.” Another states that, “it is conducive to the prosperity of society.”

The term also has a wide range of emotional associations, adding to the complexity of the idea of “value.” Some define value as being synonymous with “good and evil and to be preferred because of its freedom from the theological and transcendental implications…” (Osborne, 1931) Rokeach (1979), gives a clear and concise definition. “Values are standards that are to a large extent derived, learned and internalized from society and its institutions. These standards guide the development of a socially defined sense of self as a competent and moral member of society.” (Rokeach, 1979) In this context, values represent judgments about right and wrong, good and bad.

Attitude is another term riddled with complexity and ambiguity. Hudson and Rosen, 1953, state that, “traditional ‘attitude surveys’ in attempting to arrive at some index, such as a measure of satisfaction/dissatisfaction, seem to have made the implicit assumption that ‘attitude’ is equivalent to evaluation.” The term can also be defined as equivalent to “norm” and “perception,” but these assumptions can lead to confusion, especially when surveying human attitude. (Hudson and Rosen, 1953) Eagly and Chaiken, 2007 argued for the advantages of a more inclusive definition of attitude. They use an umbrella definition that expresses attitude as, “a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor.”

Their definition makes a distinction between attitude as an inner tendency and the evaluative responses that express attitude. They state three key features of human attitudes, tendency, entity and evaluation. Entity is also described as the attitude object, or the entity that is being evaluated. Entities can be concrete or abstract objects. (Eagly and Chaiken, 2007)

It is important to remember when conducting attitude surveys that an initial response to an attitude object can be influenced by predispositions and values. Past experiences can create “mental residue,” that lingers in the mind and effects future
experiences. Evaluative mental residue can affect attitude. Some past studies have declared that all attitudes are enduring and unchanging. Eagly and Chaiken, 2007, claim that attitudes can be short term or long term. Some can be enduring but not all. They also claim that attitudes can exist at anyplace on the spectrum of human consciousness from unconscious to fully aware. Human attitudes are evaluations made in the mind that are eventually expressed, inwardly or outwardly. There are many different types of responses. These responses include judgements, emotions and behaviors. (Eagly and Chaiken, 2007)

Behaviors are largely influenced by a combination of beliefs and values. (Papadakis, 2001) Rokeach (1979) contributed a significant publication to the literature on understanding human values. He states that the literature shows that “values are consequential for behavior.” Understanding the motivations behind human behavior includes evaluating human values and beliefs and what influences those values and beliefs. Understanding values can lead to a better understanding of behavior. Rokeach states that, “…values may be said to be complex precodings for behavioral choice – precodings that also continually change in response to current inputs.” (Rokeach, 1979)

Values can be fluid and flexible. Changes in values can come from current inputs, such as new information or knowledge. Values are not innately ingrained in humans but are learned through experience and inputs of information. Therefore, altering and influencing values is one way to impact and change human behavior. This concept is fundamental to environmental education, regarding the goal of achieving environmental literacy. Gaining new information and new life experience is one way in which values and beliefs are changed. “Values emerge from learning.” (Rokeach, 1979)

Environmental education therefore has a broad role to play in shaping complex human ideas and behaviors. It also exists in both the formal and informal sectors. A 2015 study claims that formal, classroom environmental education is not always sufficient and that instruction outside of the classroom is needed. (Erdogan, 2015) This is where informal education comes into the picture. Informal environmental education is often conducted in an outdoor, hands-on setting. These types of experiences can be found at zoos, aquariums, wildlife parks, nature centers, museums, camps, national parks and other related venues. Informal, outdoor settings for environmental education may offer a more effective learning environment, allowing students to be immersed in and interact with the natural world. Informal environmental education can be beneficial in its own right and complimentary to formal education. (Erdogan, 2015) Informal education programs in the United States also have more freedom to determine their curriculum and subject matter due to a lack of any major inclusive public policy governing the informal education sector. (Ruggiero, 2016)

Oztas (2015) conducted a study to evaluate the impacts of a two-week environmental education course. A major goal of the study was to assess a potential correlation between knowledge and environmental attitude. Questionnaires were given to students pre- and post-program to evaluate knowledge and attitude. The study found that knowledge increased after the course. Attitudes also improved post-course. It was found that students who scored higher on the knowledge section of the pre-test were more favorable towards the environment. This was also found of students scoring high on the
knowledge section of the post-test. This outcome suggests that there is a potential positive correlation between knowledge and attitude. (Oztas, 2015)

A similar study was also conducted in 2015 to evaluate the effects of a summer environmental education program on environmental literacy of elementary students. This study assessed student knowledge, affect, skills and behavior. Therefore, this study is more comprehensive than the Oztas, 2015 study. This study also used a pre-posttest design to evaluate environmental literacy. The project is grounded in the idea that in order to alter environmental behavior, the student must learn about and take an interest in the natural world. The author also states that the combination of knowledge and awareness is necessary for developing environmental action skills. The exact motivation behind environmental behavior is complex and cannot be contributed to one single variable, but to a combination of variables. The results of the study showed an increase in knowledge in certain topics but not all topics tested. Affective tendencies were high in both the pre- and post-tests. The study also showed that the summer environmental education program caused a significant increase in responsible environmental behavior. (Erdogan, 2015) Similar results were found in a 2014 study looking at short term effectiveness of an outdoor education program for teachers. The teachers showed improved environmental awareness and sensitivity following the program. This study cites the need for a follow up study for a more comprehensive, long-term understanding of the impacts. (Berberoglu et al., 2014)

These studies claim that knowledge, awareness and attitude are some of the driving variables behind motivating environmental behavior. Rickinson (2001), states that environmental education is effective in increasing knowledge and improving environmental attitude but that the exact mechanisms for how this is achieved is not fully understood. (Berberoglu et al., 2014) Digby (2012), conducted a study looking at the influences of adult environmental behavior. The study performed a secondary analysis of a past survey project conducted in 2008 in Minnesota to evaluate influences of environmental literacy in adults. They state that many factors play a role in influencing adult environmental literacy and the exact roles of knowledge, attitude and behavior are not fully understood. What we do know is that environmental education is important for informing and affecting positive attitudes and behaviors regarding the environment. The study found that participation in informal environmental education is a strong predictor of environmental behavior. After controlling for demographic variables, they found participation in informal environmental education to be a moderate predictor of environmental behavior. The study also reported that participation in informal environmental education programs improved knowledge, attitude and behavior models. (Digby, 2012)

Digby (2012), stated that, “Coyle (2005) reported evidence for instance that environmentally knowledgeable people are 10% more likely to save energy in the home; 50% more likely to recycle; 10% more likely to purchase environmentally safe products and 50% more likely to avoid using chemicals in yard care.” It was also found that the strongest predictor for recycling practices was knowledge and awareness of available recycling programs. (Digby, 2012)
The unifying finding in the majority of the studies cited above is that informal environmental education increases knowledge, increases awareness, improves attitudes and increases responsible environmental behavior. The exact way in which participation in informal environmental education leads to responsible environmental behavior is not known, but we do know that environmental education is a vital variable in influencing environmental literacy. (Digby, 2012) (Erdogan, 2015) The literature on zoo educational experiences shows similar results. Falk et al., (2007), Nickels, (2008), Miller et al., (2012) and Packer and Ballantyne, (2010) all conducted studies evaluating conservation knowledge, attitudes and/or behaviors in a zoo or aquarium setting. All studies cited showed some sort of positive impacts in knowledge gained, attitudes improved, or behaviors reportedly changed. Methodological issues with the Falk et al., (2007) study aside, the literature suggest similar impacts of informal education programs and educational experiences at zoos and aquariums. The literature suggest that zoos and aquariums could potentially be important venues of informal environmental education, although further study will help to validate these claims.

3. Swim with Dolphins Programs

In 2005 there were at least 199 facilities that kept marine mammals in captivity for research or display purposes worldwide. Marine mammals were first exhibited in 1860 when two beluga whales were captured and placed in freshwater tanks, where they soon died. Since, thousands of marine mammals have been exhibited in dolphinariums, aquariums, zoo, and marine mammal parks. Of all captive marine mammals, dolphins are the most commonly kept. (Ludin, 2010)

Historically, animals were taken from the wild and placed under human care. This method is still popular in Asian countries. Modern, Western marine mammal display facilities rely on captive breeding programs. (Lundin, 2010) Some facilities are focused on research, rehabilitation and release while others are focused more on entertainment. Sea World is the most well-known marine mammal park in the US. Facilities such as Sea World rely on paying visitors to sustain their theme parks. Sea World claims a mission of conservation and education in conjunction with entertaining people through connection to nature. Sea World states, “From habitat protection and supporting ocean health initiatives to our many rescue and rehabilitation efforts SeaWorld is part of conservation projects across the globe. This is our mission and we want to inspire others to take action and join us in the efforts to save wild animals and wild places.” (seaworldcares.com)

One specific draw of many marine mammal parks and dolphinariums is the opportunity to interact with animals through a swim-with-dolphins program (SWD.) In 1985, the National Marine Fisheries Service authorized in the United States a small number of facilities to use dolphins in swim programs. (Brensing et al., 2005) Modern marine facilities with captive dolphins generally offer three types of human-dolphin interactions. The available interactions include feeding, swimming with dolphins, and dolphin assisted therapy, or DAT. These captive marine environments are believed to be a way to support both marine education and conservation. (Wiener, 2013) In recent years, studies have been conducted to evaluate the impacts of dolphin interaction programs. The
majority of studies look at the effects on the human participants. Few studies exist that evaluate the impact on the animals.

Swimming with dolphins in both captive and wild environments creates a unique and interactive experience that is different from other zoo and aquarium experiences. Besio et al (2008) states that, “The embodied experience of dolphin tourism being in dolphins' spaces not just gazing upon them produces an intimate connection between the seer and the seen, and between humans and nonhuman animals. We had read about swimmers' enthusiasm in guest logs and heard over and over again from people who guided the tours that swimming with dolphins was much more than detached gazing upon animals: it produced an emotional response.” (Besio et al., 2008)

Swimming with dolphins thus changes the zoological experience from a passive to an active experience. “SWD provides an opportunity to ‘touch the flesh . . . of one of nature’s most charismatic characters’ Such ‘participation’ obscures the division between animal and human, and provides an imaginary ‘at-onement’ with nature” (Curtain and Wilkes, 2007) Being able to swim with, touch and interact with such charismatic, loved animals creates a more emotional experience that simply viewing animals in a zoo or aquarium.

Much of the unique and special nature of swim-with-dolphins programs is due to the human emotional connection to dolphins. Curtin and Wilkes (2007) state that, “Cetaceans, particularly dolphins, consistently produce a strong positive emotional reaction in many people.” Dolphins are generally perceived as one of the animals most loved by humans. They are seen as intelligent, friendly and charismatic. Skibins and Powell (2013) state that zoos could use human emotional connection to charismatic megafauna, such as dolphins, to their advantage. Megafauna in zoos and aquariums can be used as ambassadors for biodiversity conservation due to the human sense of connection with these animals. (Skibins and Powell, 2013)

A 2001 study looked at the impacts of swimming with dolphins on human anxiety and wellbeing. Webb and Drummond (2001), hypothesized that swim-with-dolphins programs would increase wellbeing and decrease anxiety of human participants. The study sampled participants from two marine parks, one group swam with dolphins and one swam without dolphins. It was found that post swim physiological and psychological wellbeing increased for both groups but was higher in the dolphin swim group. Anxiety was found to decrease in the dolphin swim group but did not noticeably change in the second group post swim. Another finding showed that pre-swim wellbeing levels were higher in the dolphin swim group, before ever setting foot in the water. This may be due to the anticipation of a new and exciting experience, such as swimming with wild, charismatic animals. The noted anxiety decrease may be due to the dolphin swim experience including all elements of “human emotional peak.” Human emotional peak was defined in a 1998 study as an experience that includes intention, reciprocity, connectedness, aliveness and harmony. (Webb and Drummond, 2001)

There is limited information in the literature describing the impacts of swim-with-dolphins programs on the dolphins themselves. One such study was conducted in 2005. Bresing et al., (2005) observed and evaluated dolphin assisted therapy, or DAT, at two marine facilities and compared the behavior of the dolphins at each facility. One of the
The second study facility was Dolphin Reef in Israel. This study focused on “unstructured” swimming programs at Dolphins Plus and Dolphin Reef. The study found that dolphins at both locations increased swimming speed, diving depth and breathing frequency when interacting with human swimmers. Some dolphins displayed behaviors associated with stress and danger. The increase in swimming speed could be resultant of an attraction to or a repulsion from swimmers. At the Dolphins Plus location the dolphins seemed to avoid swimmers. At Dolphin Reef the dolphins seemed to be attracted to swimmers. The difference in behavior could be due to a multitude of factors, including enclosure size and conditions. The dolphin enclosure at Dolphin Reef is significantly larger in size than the enclosure at Dolphins Plus. (Brensing et al., 2005) Further research regarding the impacts of swimming with dolphins on the animals would be beneficial to better understand the impacts of human interaction with captive dolphins.

Miller et al (2013) looked at the impacts of both dolphin shows and human-dolphin interactions on conservation. The interactive programs evaluated in this study include SWD programs. The purpose of their study was to determine the conservation value of such programs due to a lack of information in the literature. They state that, “the current study is the first quantitative multi-institutional study examining the effects of these programs. Determining the types of experiences that will have beneficial long-term effects is critical to ensuring the conservation of dolphins and the marine environment.”

The study consisted of a repeated measures design, very similar to the design of this project. Surveys were conducted prior to a program, directly following a program, and months after the program to assess knowledge, attitude and behavior. The results showed that, “dolphin show participants demonstrated a short-term increase in conservation-related knowledge, attitudes and intended behavior.”

Participants in interactive dolphin programs showed similar increases. These interactive participants also showed significant increase in knowledge, attitudes and behavior 3 months later. This contrasts with the dolphin show participants who retained conservation-related knowledge but showed a return to baseline levels pertaining to attitude and behavior after 3 months. This study concluded that both dolphin shows, and interactive programs can both have a positive conservation education impact. Our current study will follow many of the same methods and see how our results compare. (Miller et al., 2013)

There is limited literature evaluating the impacts of programs involving human-dolphin interactions. Swim-with-dolphins programs are generally thought to aid marine conservation and are claimed to be education experiences. There are few studies that analyze the conservation impacts of SWD programs and other dolphin interaction programs. SWD programs offer a unique and rare opportunity to closely interact with charismatic megafauna. This type of experience can lead to an emotional response in humans due to the active rather than passive nature of SWD programs. Webb and Drummond (2001), studied the impact of SWD programs on human anxiety and well-being. The study found that swimming with dolphins caused increased well-being and decreased anxiety in swim participants. This study did not include an investigation of conservation or education impacts. Bresing et al., (2005) evaluated the impacts of SWD
programs on dolphin behavior. This study observed captive dolphins from two separate facilities. They found that dolphins at both facilities exhibited signs of stress and danger while swimming with humans. This study did not have a conservation focused but rather focused on dolphin wellbeing. Miller et al., (2013) was the only study included in this section that evaluated the conservation and education impacts of human-dolphin interactions. The study utilized a repeated-measures design and findings included both short-term and long-term increases in knowledge, attitude, and intended behavior. Miller found that interactive programs, such as SWD, had a more powerful, lasting impact on visitors than the dolphin shows. Many studies evaluating the impacts of human-dolphin interactions don’t include a conservation focus. Miller et al., (2013) is one of few that evaluate the conservation value of programming at dolphinariums. The current study will utilize a similar survey design and methodology and will add insight and understanding to the impacts of SWD programs.

4. Conclusions

Many of the studies cited in this chapter call for further investigation of the impacts of zoos, aquariums, and swim with dolphins programs as they engage in informal environmental education. Numerous studies have been conducted in recent years. The majority of these studies have shown some sort of positive impact of zoo and aquarium visits on conservation knowledge, attitudes, and behavior. (Falk et al., 2007) (Nickels, 2008) (Packer and Ballantyne, 2010) Miller et al. (2013) showed similar positive impacts regarding swim with dolphins programs. Although methodological issues have been present among studies evaluating the conservation education impacts of zoological facilities. These issues reiterate the call for further study. (Mariano, 2010)

Swim with dolphins programs offer a unique experience, different from other zoo and aquarium experiences. Swimming with dolphins allows a visitor to physically interact with highly intelligent and charismatic species. The available literature suggests that these types of experiences can offer a unique way to support marine conservation and education. (Weiner, 2013) SWD programs, similar to environmental education programs, approach educating participants through exposure to nature in hopes that participants will leave with altered attitudes towards the natural world. SWD programs can potentially achieve this through creating an emotional connection to the animals. It is possible that if participants care for the animals they will be more likely to exhibit conservation behaviors that could protect marine environments. Informal environmental education is thought to function in a similar manner. Participants are exposed to experiences and information in hopes that a new input of knowledge will alter attitudes and inspire environmentally responsible behavior.

The literature evaluating the impacts of SWD programs is nevertheless very limited, and therefore it is difficult to draw reliable conclusions about their conservation value until further research is conducted. This study will further evaluate swim with dolphins programs and add to this limited body of literature.
Chapter 3 – Methods

1. Introduction to Study

This study is being conducted to answer the following question: does the experience of visiting Dolphins Plus affect visitor knowledge, attitudes and behavior regarding conservation? Dolphins Plus is dolphinarium with goals including marine conservation, research, education and public outreach. The study surveyed visitors of Dolphins Plus before and after participating in a swim with the dolphins program and an introductory orientation at one of the two Dolphins Plus facilities. This project included implementation of a pre- and post-visit repeat measures survey research design. Visitors were surveyed before arriving at Dolphins Plus; this initial, Pre-Swim survey focused on gathering background knowledge, attitudes and behaviors along with demographic information of the sample population. The second survey was a Post-Swim survey implemented following the visit to Dolphins Plus. This survey gauged short-term, immediate impacts of the programming at Dolphins Plus to evaluate changes in knowledge and attitudes.

The change in knowledge, attitudes, and behavior are a function of the visit to Dolphins Plus. (table 1) Intervening factors potentially influencing the change in knowledge, attitudes and behavior include demographic information such as age, gender, nationality, and level of education along with factors including frequency of past visits to zoos, aquaria and marine parks, and level of interest in learning about marine life. The purpose of this study is to evaluate the impact of the visit to Dolphins Plus. The study will analyze the impacts of programming at Dolphins Plus to understand how the visit potentially impacts visitor knowledge and attitude.

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<th>Table 3.1. Interaction of Study Variable Types</th>
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The project was initially intended to act as the full length, official study as originally proposed by Dolphins Plus. Time constraints and unexpected challenges with survey design and implementation altered the scope of the study to function as a pilot study for a larger, more extensive survey project to be conducted by Dolphins Plus in the near future. This pilot survey will give Dolphins Plus insight to the effectiveness of the survey design, implementation, and analysis of survey results. Issues, challenges and
problems will be identified for alteration in the future study, as well as recommendations for alterations and improvements to all three components, will be addressed in the concluding chapter.

This project was completed in conjunction with Dolphins Plus researchers. Dolphins Plus researchers designed and wrote the initial proposal for the study prior to my involvement. The surveys originally proposed and designed were heavily edited by myself and my research committee in conjunction with Dolphins Plus researchers. The final questionnaire design included shortened surveys with added questions borrowed from Miller et al. 2013. The inclusion of questions taken from past literature gives this study better grounding in the literature.

2. Guidelines for Survey Research

Dillman (2014) provides an extensive framework of guidance for design and implementation of survey research. He describes the “four cornerstones of quality surveys” in terms of the different errors often found in survey research and the importance of mitigating these errors. The first error discussed is coverage error. Coverage error occurs when the list that the survey sample is drawn from is not accurately representative of the population. Quality survey research covers the population effectively and accurately representative of that population. The next error discussed is sampling error. Sampling error is another error in representation. This type of error occurs when some rather than all members of the sample frame are surveyed. Dillman (2014) describes the sample frame as “a list of members of the target population.” Non-response error occurs when characteristics of non-respondents differ from characteristics of respondents in a way that is meaningful and impactful to the study. For example, if the respondent group is already pre-disposed to a certain opinion, value or attitude that is not generally possessed by the non-respondents, there will be a bias in the results. Finally, measurement error occurs when respondents are unable or unwilling to provide responses that are accurate. This error can occur when questions are designed in a way that do not accurately measure the surveyor’s intended idea. (Dillman et al., 2014)

A major issue facing any researcher conducting survey research is reluctance of survey recipients to respond. Dillman (2014) provides guidance on how to reduce response reluctance. First it is important for researchers designing and implementing a survey to keep in mind that their personal perspective will differ greatly from the perspective of the recipient. The recipient may view the survey invitation as intrusive or bothersome or may not be interested in the topic of the survey. The researcher is generally focused on minimizing costs, administering their survey to as many recipients as possible and receiving a satisfactory response rate. The potentially self-centered nature of the researcher or survey sponsor may impede their ability to understand and reconcile differing perspectives. (Dillman et al., 2014)
Throughout the history of survey research, many theories have been proposed to describe the motivation behind how respondents decide to respond to surveys. Many of these theories emphasize the internal thought process of the potential respondent. They generally do not provide guidance to create a holistic data collection protocol, keeping in mind all of the many features of a survey that can affect response rates. Dillman introduces the idea of social exchange to combat this issue. Social exchange is described as the idea that, “people are more likely to comply with a request from someone else if they believe and trust the rewards for complying with that request will eventually exceed the costs of complying.” The concept of social exchange was originally coined in the 1960’s as a model to understand human interaction. Social exchange as a concept reconciles the idea that humans find meaning in human interaction with the idea that humans operate in order to fulfill self-interests. Social exchanges differ from economic exchanges. Social exchange is much more flexible in nature. Specific benefits to be gained are often not specified in advance. Benefits are based in trust that they will be in fact be delivered. The types of potential benefits are varied and are not limited to financial gain. By applying this concept of social exchange to survey research we are more apt to consider many aspects of how a survey invitation is viewed and how those features influence the respondent. It pushes surveyors to look at the issue of survey response rates in a holistic manner. An unlimited number of factors come into play when a recipient is deciding if and how to respond to a survey. Response rates are generally higher when numerous aspects of the survey invitation work together simultaneously in a way that is encouraging to respondents. (Dillman et al., 2014)

One limitation to survey research is that the benefits of responding to a survey can be limited. This does not mean that benefits are nonexistent but that they are often based in altruism and a desire to help others. Humans are known to feel rewarded after helping another even when a physical reward is not expected. Even small tokens of gratification will often influence people to respond to a request for assistance or consultation. By keeping these human tendencies in mind, surveyors can work to increase response rates. One way of doing so is to explain to recipients that their feedback will be impactful and of use to some sort of worthy cause. People often will respond favorably to the idea that their contribution will have a real impact on the lives of others. It has also been shown that people feel a benefit from being asked for their personal advice. When respondents are asked for advice or assistance they feel that their contribution is truly valued. Other methods to ensuring a high response rate is to use incentives in the form of small gifts or monetary compensation. It is also important to keep in mind the balance of costs and benefits of completing the survey. Surveyors should aim to keep costs low by ensuring the survey is of a manageable length, is straightforward, and is presented in a way that is convenient to recipients. (Dillman et al., 2014)

Ensuring trust between the respondent and surveyor is also vital to increasing response rates. Respondents are more likely to reply if the survey is sponsored by a known and trusted organization. Identity theft is a valid concern for potential respondents. Sponsorship from a trusted organization should be visible in the survey, for
example, displaying a logo at the beginning of the survey. Assuring confidentiality and guaranteeing data security is another way to gain the trust of potential respondents. (Dillman et al., 2014)

A final method of increasing benefits to respondents is by applying the concept of social exchange. This concept, as mentioned previously, is holistic in nature. By applying social exchange, a surveyor is balancing all aspects of costs, benefits, and trust. Surveyors must also be aware that the same tactics cannot be applied to all surveys. The survey population, topic, sponsorship and mode of delivery will all impact how the concept of social exchange is applied. (Dillman et al., 2014)

When designing a survey one of the first things to consider is survey coverage, or who to send the survey to. Dillman (2014) describes coverage rate as “the proportion (often estimated) of the target population that is included in the sample frame.” To reiterate, coverage error, is described as one of the four cornerstones of quality surveys. Mitigating coverage error is vital to conducting successful survey research. Coverage error is calculated by multiplying the coverage rate by the difference on a variable between those covered in the sample frame and those not covered. Internet surveys have their own set of coverage issues. As of 2013, 85% of US adults have internet access and use the internet at least on an occasional basis. It is also true that certain demographics are more likely than others to use the internet. This alone can increase coverage error. Surveyors conducting internet surveys should be cognizant of these potential issues. (Dillman et al., 2014)

In the beginning stages of survey design, another aspect to think about is the type of sampling that a surveyor will be conducting. My project used non-probability sampling methods. Sampling techniques can be separated into probability and non-probability. In probability sampling, … “every member of the sampling frame is given a known, non-zero chance of being included in the sample that allows a survey’s results to be generalizable to the full target population, even though only some members of the population are selected.” Generally, online survey research relies on non-probability sampling. (Dillman et al., 2014) Acharya (2013) describes non-probability samples “…in which the probability that a subject is selected is unknown and results in selection bias in the study. They include the most commonly used convenience/purposive sampling, quota sampling, snowball sampling, etc.” My study will utilize convenience sampling. In convenience sampling, samples are chosen because they are conveniently accessible to the surveyor. (Acharya et al., 2013) Some common obstacles to non-probability sampling include, reliance on volunteers and low overall participation rates. (Dillman et al., 2014)

After the sampling type and coverage rates are considered, a surveyor can move on to designing the survey questions. Question writing should begin with the surveyor deciding what exactly it is that they are attempting to measure. This can be done by writing clear, specific research questions, defining the goals of the survey, and breaking down relevant concepts. Often surveyors are looking to measure concepts that are too large to evaluate successfully with a single question. Concepts should be broken down
into specific domains that can be easily answered with a single question. The type of information the question is asking for should also be considered. Demographic questions will be straightforward and require little processing time for the respondent while complex attitude or behavior questions can require excess time to formulate an answer. It is best to try to keep questions as simple as possible that will not require excess time to recall an answer. (Dillman et al., 2014)

The mode of survey administration is another survey feature to be considered when writing questions. Surveys will fall into one of two categories, interviewer-administered or self-administered. Interview-administered surveys present their own set of potential issues. When a respondent is being asked questions by an interviewer it is possible to get clarification about confusing or misleading questions. When being interviewed there is also the issue of social desirability. People tend to want to come across in a positive way to the interviewer and may not answer questions honestly. Interview bias is also a concern. The physical appearance, gender, race and tone of voice can all influence the way in which people respond to questions. Computerization of surveys is another feature to be considered when designing a survey. Customization options and automation features are possible with computerized surveys that are not possible with paper surveys. These features can mitigate certain issues present in paper surveys. Human errors and discrepancies between answers can be recognized and remedied when completing a computer-based survey. Dillman (2014) gives the example of a respondent entering a certain birth year and later in the survey providing an age that is not consistent with their stated birth year. A computer-based survey can recognize and flag this inconsistency.

One key feature of any quality survey is a composition of varied question types and formats that work harmoniously to produce quality data. When writing a survey, it is necessary to consider question type and format. Questions fall into one of two question formats, open ended or closed ended. Open ended questions are less limiting and allow the respondent to formulate a customized and personal answer. Open ended questions have their benefit but are often skipped by respondents due to their burdensome nature. Closed ended questions can be more limiting due to the respondent having to choose from a set list of answer choices. On the other hand, they are skipped less often and are easier and simpler to provide an answer to. Questions can also be a hybridization of formats, known as a partially closed-ended question. A common question type of this format would be a multiple-choice question with an “other” option followed by a text box. This question type allows respondents to choose an answer that is not expressly given and elaborate on that answer. One question format will have benefits over others depending upon the type of feedback that the surveyor is looking to gather. Questions should be simple, specific, clear, and applicable to the respondent. (Dillman et al., 2014)

The order in which questions are displayed to respondents can be just as important as the formatting of each individual question. Surveys are compilations of questions that exist in the context of the question itself and the context of the survey as a
unit. Keeping this in mind will aid in forming a cohesive and effective survey. Dillman (2014) provides guidance on how to most effectively order questions. He suggests that a survey should be organized in a way that mimics natural conversation. Questions covering similar topics should logically be grouped together. Another guideline is to begin the survey with questions that the respondent will find easy to answer and interesting. The first questions will act to grab the attention of the respondent in hopes that they will commit to completing the survey. In the same light, it is recommended to place more difficult or potentially controversial questions at the end of the survey. Respondents will be more likely to answer these sensitive questions after they have had the opportunity to become comfortable and familiar with the rest of the survey.

Determining the effectiveness of the survey question format and order is an important step in the survey design process. Pre-testing and conducting pilot studies are ways of gathering feedback regarding the design, wording, order and overall effectiveness of a proposed survey. (Dillman et al., 2014)

As of 2014, web-based surveys were the fastest growing survey form in the United States. Proportions of the population that are internet users is constantly increasing, making web-based surveys an attractive option to surveyors. There are numerous benefits to conducting survey research online along with limitations that must be thoroughly examined and considered. Benefits include ease of survey administration, access to large numbers of respondents quickly, and low cost to design and implement.

3. Questionnaire Design

The project uses a repeated measures design. Visitors were given two different but highly similar surveys. One survey was administered prior to coming to Dolphins Plus and a second survey was administered post-visit to Dolphins Plus. The intended project included a third, follow-up survey to gauge long term knowledge retention, and long-term changes in attitude and behavior. The follow-up survey was not included in this project at this time due to time constraints and challenges. The three-survey model was intended to gauge both immediate, short term effects along with long term, lasting effects on visitor’s knowledge, attitudes and behavior. Instead, the intended survey was altered to use a repeated-measures design that does not include a follow-up survey. Only, immediate impacts of the Dolphins Plus experience are analyzed in this study.

This project made use of web-based surveys in place of paper surveys. The literature regarding similar studies evaluating zoo, aquaria and swim-with-dolphins programs generally use an in person, paper survey design. Implementing a web-based survey creates a very different survey experience for the respondent and includes challenges and limitations not present in past projects. These limitations and challenges of conducting web-based survey research will be discussed further, later in this chapter.

The Pre-Swim survey content was focused on four sections: visitor demographics, background knowledge, attitude, and behavior. The Post-Swim survey omitted the
demographic information as it was already gathered during the Pre-Swim survey. The knowledge questions were concentrated on marine mammal knowledge provided during Dolphins Plus briefings and interactive programs along with general marine conservation knowledge. The attitude section included questions that gauge the respondent’s personal beliefs and values regarding conservation, environmentalism, and captive animals. The behavior section evaluated the respondent’s affinity for participating in conservation related behaviors. A sample of the survey questions were taken from Miller et al (2013). Miller conducted a study looking at interactive dolphin programs and the potential impacts on conservation education. This study was a great influence on our survey design and an inspiration for this project. A selection of questions used in Miller’s surveys were included in our surveys to be able to conduct a comparison of our results to those of the 2013 study. By including survey items from Miller’s study this study is more relevant and better grounded in the literature.

IRB approval from James Madison University was not required for this project, as it was conducted under the aegis of Dolphins Plus. The data I worked with was downloaded and anonymized by the director of research at Dolphins Plus; my dataset had no personally identifiable information.

The Survey Instruments

A. Operationalization of study variables

The independent variables in this study include the logistical information regarding the recipients visit to Dolphins Plus. These three variables include, the date of the visit, the location of the visit and the type of program(s) booked for the recipients visit. This visit information was extracted from the Dolphins Plus online reservation system prior to administering the surveys to visitors.

The survey included intervening factors that can have a potential impact on survey results. These factors include all demographic information including age, gender, education level, and native language. Other intervening factors included frequency of prior visits to zoos and aquaria, prior swimming with dolphins experience, motivation for this particular visit to Dolphins Plus, and level of interest in learning about marine life and oceans. Appendix A contains a copy of the Pre-Swim survey; intervening variables were only obtained in the pre-test questionnaire.

The dependent variables in this study include all data collected from the implementation of the Pre-Swim and Post-Swim surveys. Dependent variables fall into one of three categories, knowledge, attitudes, and behaviors.

The knowledge section of the Pre-Swim survey included 11 questions. These questions gauged respondent knowledge regarding marine mammals and general marine conservation. Of the 11 items, 4 questions utilized a multiple-choice format. The remaining 4 questions were written in a True-False format. One of the multiple-choice items, “Which of the following are leading causes of dolphin and whale deaths
worldwide?” asked respondents to select the top two causes. All other Pre-Swim knowledge items allowed only one response option to be selected. Each knowledge question included an “Unsure” response option to limit guessing on these items. A cumulative Quiz Score was calculated by adding up all correct responses for each respondent. An Unsure Score was also calculated by adding up all unsure responses for each respondent. The knowledge questions gauged visitor awareness of common threats to marine mammals, human impacts on marine life, the Marine Mammal Protection Act, and human reliance on marine resources. These questions were included to gauge visitor’s preexisting knowledge before coming to Dolphins Plus. The Post-Swim survey included 11 of the same questions and one additional question regarding marine debris. Two of the questions utilized in both surveys included response options that differed slightly in the Post-Swim survey. This issue will be addressed in the concluding chapter of this project. See the Appendix for full text of each knowledge survey item.

The attitude section of the Pre-Swim survey included 16 ranking style questions. A 5-point Likert scale was utilized for all attitudinal items. Respondents were asked to what extent they agree with the 16 statements. The attitudinal items included personal beliefs and values regarding general environmentalism, the ethics of captivity, personal impacts on the oceans, and the role of zoos and aquariums. These questions were intended to gauge respondent’s preexisting attitudes regarding conservation prior to their program at Dolphins Plus. The Post-Swim survey utilized most of the same attitudinal items and included 7 new questions. The majority of new statements included in the Post-Swim were intended to gauge attitudes related to the Dolphins Plus experience. For example, “Since my visit to Dolphins Plus I am more environmentally conscious,” was included in the Post-Swim survey. These types of items were included to determine how visitors felt about their visit and how it impacted their conservation attitudes. See Appendix for full text of each attitudinal survey item.

The behavior section of the Pre-Swim survey included 3 items. The first behavioral question asked respondents to identify if they were members of any environmental or conservation related organizations. Respondents were also asked to identify their current recycling practices. Lastly, respondents were asked to choose from an extensive list of positive environmental activities, which activities they had participated in during the past 2 years. These questions intended to gauge and evaluate what types of environmental and conservation behaviors visitors partake in prior to their visit to Dolphins Plus. See Appendix for full text of each behavioral survey item.

B. Pre-test and changes

Before the Pre-Swim survey could be finalized and sent to visitors, a pre-test was conducted to evaluate the usability of the survey. The pre-test was conducted both via email and in person, face to face. The Pre-Swim pre-test was sent out via email in hopes of receiving 20-25 responses, this goal number was not reached. The Pre-Swim survey was sent out to a total of 33 respondents prior to the administration of the finalized survey. Of the 33 recipients of the email pre-test, 11 were family and friends of the
research team. This initial pre-test was focused on gaining preliminary information to the ease of use of the survey. The goal of the initial pre-test was to evaluate the effectiveness of the questions. Edits were made according to feedback received. At a later stage in the process the Pre-Swim survey was sent to 22 future visitors of Dolphins Plus. This was considered our official email pre-test. This pre-test did not provide the insight we were hoping for. This pre-test invitation received only two complete responses and did not provide adequate feedback.

The in-person pre-test received 20 responses and was therefore the main source of feedback utilized in the editing process. The purpose of this pre-test was to determine the strengths and weaknesses of the survey design and evaluate the effectiveness of the questions. The in-person test included a brief questioning period following the completion of the survey. In-person survey recipients were selected on a volunteer basis. Prior to the start of their interactive program the guests were briefly introduced to myself and the purpose of the project and of the pre-test. Guests were asked to volunteer a few minutes of their time while waiting for their program to begin to take the Pre-Swim survey. This process was repeated over a four-day period. On the last day of the pre-testing period, small incentives were offered to volunteers. These incentives included t-shirts, mugs and water bottles. The volunteers completed the survey on site and were questioned directly after finishing the survey. The respondents were asked the following questions in an informal interview fashion:

1. Did you find any questions confusing or misleading?
2. Did you have any issues with the wording of any questions?
3. Were there any questions that would make you want to stop answering and quit the survey?
4. How did you feel about the length of the survey?
5. How did you feel about the rating questions (Likert scale)? Did you find them to be overwhelming or manageable?

Following the completion of the pre-testing phase the survey was edited accordingly. All feedback was taken into consideration. Following the pre-test, select questions were re-worded to remove advanced and potentially confusing language. Select questions were elaborated upon to be clear to international recipients. The survey length was shortened slightly due to numerous comments of the survey being too lengthy. This was achieved by removing select Likert Scale items from the end of the survey. This was done in hopes to reduce survey fatigue.

4. Implementation

To administer the Pre-Swim survey, visitor contact information had to be gathered. Visitor contact information was gathered for the Pre-Swim survey using the
Dolphins Plus online reservation system. Visitor contact information was extracted on a near daily basis beginning the first week in June of 2017 through the end of July 2017. Name, email addresses, booking date, program date, zip code and program location of all visitors who booked a program during the study period were manually extracted from the reservation system and compiled into a contact list database. The process of compiling contact information of visitors to Dolphins Plus was not an automated process and therefore had intrinsic limitations that will be discussed further. The second survey was administered to visitors after visiting Dolphins Plus using the same contact list database.

The first Pre-Swim survey email invitation was sent out on June 22, 2017 and was sent to 359 recipients. The 359 recipients were composed of all future visitors to Dolphins Plus registered for a program at least one day in advance. Pre-Swim survey invitations were then sent via email on a rolling basis through July 17 as new reservations were made. After final editing, the Pre-Swim survey was sent electronically, via email, to all currently registered visitors at both Oceanside and Bayside locations. Visitors registered for programs with Dolphins Plus from mid-June through December 2017 were sent the Pre-Swim survey at the same time. For this study, we decided not to determine a set time period prior to arrival to send out the Pre-Swim survey. The decided methodology included sending the Pre-Swim survey on a rolling basis as new reservations were made. Same day reservations were left out of the survey sample due to inadequate time for visitors to complete the survey prior to their program. Visitors who submitted the Pre-Swim survey after visiting Dolphins Plus were kept in order to analyze for response bias. Reminder messages were implemented for the Pre-Swim survey but were not automated. The first reminder prompt was sent manually one week after the first Pre-Swim invitation was sent. The message was sent to all non-respondents. The next reminder was sent to all non-respondents on 7/16, 17 days after the first reminder prompt. A final reminder message was sent out six days later on 7/22, the final day of the Pre-Swim survey period. This reminder prompt methodology was inconsistent and less effective than a set, automated reminder prompt could have potentially been. This will be discussed later in the recommendations.

The Pre-Swim survey implementation was challenging, and many limitations were realized. The first challenge was not being able to send out the Pre-Swim surveys at a set time interval prior to the recipient’s program date. Due to the lack of automation in the process of extracting visitor contact information and sending out survey invitations the surveys were sent on a rolling basis. This methodology prevented surveys being sent at a set time interval pre-program date. There may be a way around this manual extraction of contact data that was not evident to surveyors during this project. Recommendations to altering this process will be made later. At the time of administering the Pre-Swim survey, the automatic reminder prompt feature available using Survey Monkey was not realized by the surveyor team. Therefore, reminder messages were not sent at a set time interval for the Pre-Swim survey. This human error will also be addressed in recommendations for designing a more consistent, effective future study.
The Post-Swim survey was sent out to visitors at least 10 days after their visit to Dolphins Plus. The first initial Post-Swim survey invitation was sent out to all visitors to Dolphins Plus between 6/26/2017 and 7/15/2017. This invitation was sent out on 7/25/2017. After the first mass invite, survey invitations were scheduled to be sent out automatically on a daily basis so that visitors received the Post-Swim survey exactly 10 days after their scheduled program. This automated invitation feature was utilized for the Post-Swim survey only. The 10-day term post-visit was chosen to be a sufficient amount of time for international visitors to return home from vacation. It was also chosen to be a short enough period of time as to prevent visitors from having sufficient time to conduct their own research or inquiry into the topics discussed and taught during their visit to Dolphins Plus regarding marine mammals and marine conservation. Automatic reminder messages were also scheduled to be sent to Post-Swim survey recipients one week after receiving the initial Post-Swim survey invitation. The one-week reminder period was chosen based upon recommendations provided by Dillman et al (2014).

The Pre-Swim survey had a response rate of 40.56%. The net number of Pre-Swim surveys sent was 784. Of the 784, 10 bounced and were undeliverable. 19 recipients opted out of the survey. 549 of 784 were opened by the recipients and 206 were left unopened. 318 recipients responded to the survey in some capacity, 236 in entirety and 82 were partial responses. Of the 236 complete responses, 212 both completed the full survey and agreed to take the survey. Therefore, 212 responses were actually usable for this study.

The Post-Swim survey had a response rate of 27%. The net number of Post-Swim surveys sent was 710. Of 710, 14 bounced and were undeliverable. Another 17 recipients opted out of the survey invitation. 351 of 710 were opened by the recipients and 328 were left unopened. The Post-Swim survey acquired 103 complete responses and 89 partial responses. Of a total 192 responses, 80 both completed the full survey and agreed to take the survey. Many respondents to the Post-Swim survey did not complete the Pre-Swim survey. The Post-Swim survey was sent to any recipient of the Pre-Swim survey. Many respondents chose to complete one survey and not the other. Because of this, the usable responses from the Post-Swim survey is 37. This is the number of survey recipients who fully completed both surveys. Therefore, the usable pre-post comparison dataset is fairly small, with only 37 respondents. 710 visitors to Dolphins Plus received both surveys, of 710, only 37 were usable for pre-post comparison analysis.

5. Data Validity

Data validity is vital to any research project and should always be carefully considered when designing and implementing a project. Data validity indicated the soundness of the research. There are many factors involved in survey research that can affect data validity.
Self-selection bias was a major concern when designing this project. This limitation is at the forefront of this project. There exists an inherit uncertainty when relying on the public for voluntary cooperation. This study is completely reliant on the visitors of Dolphins Plus being willing to complete online surveys. Some visitors will likely opt out of taking the surveys and some may not complete the surveys in their entirety. There are many factors at play that can influence a visitor’s decision to take a survey. Motivation to participate in survey research is discussed at length by Dillman (2014) He attributes the motivation of a respondent to respond to a survey to the theory of social exchange. Social exchange is described as the idea that, “people are more likely to comply with a request from someone else if they believe and trust the rewards for complying with that request will eventually exceed the costs of complying.” Dillman suggests minimizing costs of responding to a survey and increasing the rewards. This can be accomplished by designing a survey of acceptable length that is straightforward, simple and user-friendly. (Dillman et al., 2014)

Nonresponse bias is another limitation of this project potentially affecting data validity. Our respondents are limited to people who choose to visit Dolphins Plus. Many factors come into play when determining who visits Dolphins Plus and who does not. The location of Dolphins Plus will impact those who visit. Key Largo is a tourist destination and therefore many visitors to Dolphins Plus are tourists, many from European countries. Economic factors also play a part. Participating in programming at Dolphins Plus can be a relatively expensive experience that may not be affordable to certain sectors of the population. There is also the issue of people’s attitudes and beliefs regarding animals in captivity. There are certain sectors of the population who would decide not to visit Dolphins Plus on the principle that they do not agree with keeping animals or specifically marine mammals in captivity. Many factors play a role in determining who decides to visit Dolphins Plus. Those who cannot or choose not to come will be automatically left out of the study sample. Therefore, the study sample population will only include adults without a moral aversion to dolphinariums who are financially able to travel to Key Largo and participate in swim-with-dolphins programs. This nonresponse bias inherently excludes many areas of the population.

Another potential threat to validity is the possibility of outside information influencing survey responses. This threat is more likely to be an issue during the post-test implementation. After visiting Dolphins Plus there is the potential for visitor’s to actively seek out information related to their experience. Therefore, it is possible that some Post-Swim survey responses were influenced by outside information and knowledge not provided by Dolphins Plus. To attempt to mitigate this issue the Post-Swim survey was sent out 10-days post-visit. This time period was decided to be short enough that respondents would have less time to conduct their own research and seek out additional information through internet searches, documentaries, articles and other means. There is still the possibility that outside information impacted the validity of this project.
Another potential threat is due to nature of respondents trying to respond in a “favorable” way. It is possible that survey respondents are either swayed by the wording of the question to try to answer in a way that they believe is correct or favored. When conducting survey research, the surveyors are at the mercy of their respondents to answer honestly.

6. Anticipated Data Analysis

The Pre-Swim survey will be first analyzed to determine the frequencies of each answer choice to begin to get a good picture of the data. Running frequencies allows the surveyor to better understand who the respondents were. Demographic information is to be included in the frequency analysis. Crosstabs will also be used with the Pre-Swim data. All intervening variables, including all demographics will be compared to all Likert scale items along with a multitude of other survey items by running crosstabs. Crosstabs will give us an idea of where possible correlations may exist before running actual analyses to determine statistical significance.

7. Design challenges, issues, choices

The survey design process was not without many challenges and setbacks. The main innate challenge with survey research is having to rely on volunteer responses. In order to receive a satisfactory response-rate many factors were considered to design a successful survey. Everything from question formatting, survey length, question type, and question order was carefully considered. Survey fatigue was also a major concern when designing the surveys. Dillman et al. 2014 suggests that surveys should be convenient, direct and of manageable length in order to ensure a decent response rate. (Dillman et al. 2014) In order to ensure that our surveys were user friendly a pre-test was administered to receive valuable feedback. That feedback allowed us to make needed alterations to the surveys in order to potentially increase response rate.

The use of Survey Monkey as a survey platform came with its own limitations. Certain question types and formats are not available using the Survey Monkey design tool. For example, questions asking to choose no more than two options were not as effective as planned. Survey Monkey was not able to limit survey respondents to a set number of options. Survey Monkey allows the surveyor to choose between allowing one single choice or an unlimited number of the available response choices. Minor limitations such as this design constraint added challenges to the survey design process. Another major design challenge was designing and formatting a survey for a web platform. Designing web-based surveys is a very different process than designing a paper survey. These differences are discussed by Dillman et al. 2014 earlier in this chapter.

Another methodological issue with using Survey Monkey was the difficulty using automation features. There are features included in Survey Monkey that allow surveys
and reminder prompts to be sent out automatically on a certain date. This feature was not fully understood or utilized for this project. The Pre-Swim survey invitations were all sent out manually, each day. The automation feature was utilized during implementation of the Post-Swim survey. Better understanding of the automation feature would have simplified and streamlined the Pre-Swim survey implementation. Due to surveys being sent manually, the time between the survey invitation and the program date varies greatly. The timing of reminder prompts for the Pre-Swim survey also varies. The Post-Swim survey implementation was much more streamlined and consistent. This issue will again be addressed in the recommendations section of the concluding chapter.

Another issue pertained to survey design. As previously mentioned there were differences between the Pre-Swim survey and the Post-Swim survey. An additional knowledge question was added to the Post-Swim survey that was not present in the Pre-Swim survey. One knowledge item included a different response choice in the Post-Swim survey than the Pre-Swim survey. Another knowledge item included a response choice that was worded differently in both surveys. There were also differences in the attitude section of surveys. The Post-Swim survey included new attitudinal items that were not present in the Pre-Swim survey. One of the attitudinal items included in both surveys was worded differently in the Post-Swim survey. These inconsistencies between the pre and post surveys constrain the ability to analyze effects on these variables. For example, response to a knowledge item include on the Post-Swim survey but not on the Pre-Swim survey cannot be analyzed for differences before and after the visit. This issue should be amended in the future study.

A final issue present in this survey project is the limited number of usable responses to the Post-Swim survey. As stated previously, the entire pre-post dataset is composed of pre and post survey responses of 37 survey recipients. Of the original 784 visitors to Dolphins Plus that received a Pre-Swim survey invitation, 37 respondents completed both surveys. This response rate and small sample size adds complications for pre-post data analysis. Voluntary response bias is a concern due to small sample size. Smaller sample sizes also exhibit higher margins of error. It is possible that because the sample is small it will not be fully representative of the study population, or all visitors to Dolphins Plus. Implementing the survey over a longer period and offering more incentive to complete the surveys may help with this issue. This will be further discussed in the concluding chapter recommendations.
Chapter 4 – Results, The Pre-Swim Survey

1. Introduction

This chapter will describe and analyze the results of the Pre-Swim survey. The chapter will begin with an investigation of visitor characteristics, including socio-demographic information and prior experiences. The chapter will then describe the results of the survey pertaining to knowledge, attitude, and behavior. Knowledge, attitudinal, and behavioral items will be analyzed for potential relationships with visitor characteristics to determine what pre-existing factors may impact survey results.

2. Visitor Characteristics

This section will provide an understanding of who the visitors to Dolphins Plus are. It will describe the purpose of their visit, the type of program they participated in, tendency to visit zoos and aquaria, and prior experiences with SWD programs. Basic demographic information including age, gender, education and nationality will also be discussed and analyzed. The purpose of this section is to begin to make inferences about visitors to Dolphins Plus and how their characteristics may influence their knowledge, attitudes and behaviors regarding marine life, conservation and the environment.

Reason for Visit

Visitors were asked to state the purpose of their impending visit to Dolphins Plus to gauge respondents’ motivations. Respondents were asked to select as many reasons that apply to their personal motivations for visiting Dolphins Plus. Most respondents (57%) selected “Love of Animals” as one of the purposes for their visit. The three most common purposes, by a sizeable amount are love of animals, curiosity, and to further one’s knowledge (table 1). This suggests that most visitors coming to Dolphins Plus are coming with a pre-existing curiosity, interest and desire to learn. Visitors coming into the experience with this type of attitude and expectations may be more likely to learn and alter their attitudes and behaviors.
Table 4.1. What is the purpose of your visit?

<table>
<thead>
<tr>
<th>Visit Purpose</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Celebrate a special event</td>
<td>20%</td>
</tr>
<tr>
<td>Curiosity</td>
<td>45%</td>
</tr>
<tr>
<td>Entertainment</td>
<td>20%</td>
</tr>
<tr>
<td>Further Knowledge</td>
<td>42%</td>
</tr>
<tr>
<td>Love of Animals</td>
<td>57%</td>
</tr>
<tr>
<td>Recommended</td>
<td>12%</td>
</tr>
<tr>
<td>Spend Time</td>
<td>32%</td>
</tr>
<tr>
<td><strong>N=212</strong></td>
<td></td>
</tr>
</tbody>
</table>

Program Participation

Dolphins Plus offers a total of six separate interactive programs and the option of participating in multiple programs during a visit. The six programs include Structured Swim, Shallow Water Experience, Kiss by a Dolphin, Guided Swim, Trainer for a Day, and Shallow Water Experience with Dorsal Tow. Because of the small proportion of visitors choosing certain programs, the six programs were combined into three categories, the Structured Swim, the Shallow Water Experience, and Other. For example, only 2 respondents participated in the Guided program. This program was placed in the “Other” category for purposes of analysis. The Structured Swim is a deep-water experience where visitors interact with the dolphins while the dolphins complete a variety of behaviors. The Shallow Water Experience is a waist-deep experience where the dolphins exhibit a variety of behaviors with the visitor. The Other category includes both the Kiss program and the Guided program. The Kiss program involves receiving a kiss from a dolphin. The Guided program is described as a natural swim with the dolphins, observing and interacting with them in their environment.

The Structured Swim was the most popular program; 74% of all visitors were involved with this program (table 2). This program is a more interactive experience than the Shallow Water Experience and could have an impact on the participant’s feeling of connection to the dolphins. Most respondents were themselves swim participants (71% of all respondents). The Shallow Water Experience did have a high proportion of visitors who did not swim. This group of non-participants may have a different experience that those who did swim. Interacting with dolphins vs observing the experience may also have an impact on emotional connectedness to the dolphins. This feeling of connection could impact visitor attitudes and behaviors. Erdogan (2015), states that in a feeling of connectedness to nature can cause people to be more likely to actively protect nature. Swim participants may therefore have a higher likelihood of altering their knowledge, attitudes and behaviors than observers, due to a higher level of interaction with the animals.
Table 4.2. Program Type by Participation Type

<table>
<thead>
<tr>
<th>Program Type</th>
<th>Percent</th>
<th>Swim Participant</th>
<th>Observer or neither</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structured</td>
<td>74%</td>
<td>115/77%</td>
<td>40/26%</td>
<td>100%</td>
</tr>
<tr>
<td>Shallow Water Experience</td>
<td>23%</td>
<td>29/58%</td>
<td>21/42%</td>
<td>100%</td>
</tr>
<tr>
<td>Other (Kiss, Guided)</td>
<td>3%</td>
<td>6/100%</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>N=212</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Prior Experiences

A focus of the pre-swim survey was past experiences of respondents to determine if these experiences influence their knowledge, attitudes and behaviors. Past visits to zoos and aquariums, as well as prior experiences with SWD programs were analyzed to assess visitors pre-existing attitudes, knowledge, and behaviors.

Respondents were asked to identify if they had ever participated in a swim-with-dolphins program previously. Most respondents (73%) had never participated in a program prior to coming to Dolphins Plus. This could have implications for visitor’s overall excitement and enthusiasm for the experience. First time visitors may experience more of a “wow factor” interacting with charismatic animals such as dolphins. Curtin and Wilkes (2007), state that, “Cetaceans, particularly dolphins, consistently produce a strong positive emotional reaction in many people.” First time swimmers are likely to exhibit this type of powerful emotional response. I would infer that first-time participants may be more likely to exhibit altered attitudes and behaviors after completing their program.

Respondents were also asked to identify the number of times they had visited a zoo, aquarium, or animal park in the past two years. Nearly half of visitors (47%) selected the 2-3 times option. The other choices were fairly evenly distributed. The frequency of past zoo visits is likely to have an impact on visitor attitudes, specifically regarding the ethics of animals in captivity. Respondents who are regular zoo visitors are probably unlikely to have any moral consternation about keeping animals in captivity.

The sector of the population that both frequently visit zoos and have previously swam with dolphins may be an interesting group to analyze regarding their attitudes and behaviors, due to their previous exposure to zoo and aquarium programming. That population subset may have a higher than average interest in dolphins and marine life due to their frequent visits to zoological facilities. See table 3 below for the distribution of number of past zoo visits by prior swimming with dolphins experience.
Table 4.3. Past Zoo Visits by Past Swim-with-Dolphins Experience

<table>
<thead>
<tr>
<th>Past Zoo Visits</th>
<th>Past Swim-with-Dolphins Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of visits</td>
<td>Percent</td>
</tr>
<tr>
<td>None</td>
<td>13%</td>
</tr>
<tr>
<td>Once</td>
<td>14%</td>
</tr>
<tr>
<td>2-3 times</td>
<td>47%</td>
</tr>
<tr>
<td>4-6 times</td>
<td>17%</td>
</tr>
<tr>
<td>More than 6 times</td>
<td>9%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
<tr>
<td>N=212</td>
<td></td>
</tr>
</tbody>
</table>

Interest in Learning

The Pre-Swim survey also included an item to gauge respondent interest in learning about marine life and oceans. This question was included to see how pre-disposed respondents may be to learn. It was also included in the Post-Swim survey for purposes of comparison, to determine if interest in learning is impacted by the Dolphins Plus experience. Respondents were asked to rate their interest in learning using a 100-point slider. For analysis purposes the slider data was recoded into 20-point interval groupings. Lower numbers indicate a lower level of interest. The Pre-Swim results show that most respondents are interested in learning about marine life and oceans. I would expect a desire to learn to correlate with a greater chance for knowledge gain than respondents who are not interested in learning about marine life. Visitors will get different things out of their experience depending upon what they are looking for and what they are open to. The table below shows the distribution of interest scores.

Table 4.4. How interested are you in learning about marine life and oceans?

<table>
<thead>
<tr>
<th>Interest Level</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-19</td>
<td>2%</td>
</tr>
<tr>
<td>20-39</td>
<td>5%</td>
</tr>
<tr>
<td>40-59</td>
<td>18%</td>
</tr>
<tr>
<td>60-79</td>
<td>30%</td>
</tr>
<tr>
<td>80-100</td>
<td>44%</td>
</tr>
</tbody>
</table>

This section provided an initial look at the characteristics of visitors to Dolphins Plus. This includes motivations for their visit, the types of programs frequently booked, and past experiences with zoos and swim-with-dolphins programs. Most visitors reported...
a love of animals to be one of the reasons for their visit. Curiosity and further knowledge were also common choices. These reasons for visiting indicate that this group of respondents have a pre-disposed desire to learn rather than to just be entertained. This could have implications for changes in knowledge and attitude. The most popular program choice was the Structured Swim. This program is also the most interactive and hands-on of all programs offered. The interactive nature of this program is likely to produce an emotion connection between the participant and the dolphins. This emotional response to swimming with charismatic animals, such as dolphins, may have an impact on the overall experience and attitude of the visitor. It was also determined that most respondents were themselves program participants. The exception to this was found among the Shallow Water Experience group. A sizable proportion of the respondents who booked a SWE program were not themselves the program participant. It is possible that these respondents were observers of the program or were simply booking the program for others and did not attend Dolphins Plus. That group of non-participants will be an interesting group to analyze for changes in knowledge and attitude keeping in mind that they did not themselves participate in the program. Past zoo and swim-with-dolphins experience was also described. Most visitors had never swum with dolphins prior to their program at Dolphins Plus. The majority of respondents were frequent zoo visitors with 2-3 visits in the past 2 years. The 2-3 visit group also accounted for the majority of respondents who had participated in a SWD program before. This population subset will be a group of interest for this study.

Demographics

The pre-swim survey gathered demographic information about respondents to better understand the study population and their possible motivations for coming to Dolphins Plus. Respondents were asked to select their age group. Most participants (44%) were 45-54 years of age. I would predict that the older age groups, having more years of life experiences and wisdom, to potentially score higher on the knowledge section of the survey. I would also expect this age demographic to have more defined set of attitudes and be potentially less likely to have a neutral response to attitudinal survey items. Respondents were also asked to identify their gender. Most participants (62%) were female.

<table>
<thead>
<tr>
<th>Age Ranges</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Percent</td>
</tr>
<tr>
<td>18-24</td>
<td>2%</td>
</tr>
<tr>
<td>25-34</td>
<td>11%</td>
</tr>
<tr>
<td>35-44</td>
<td>26%</td>
</tr>
<tr>
<td>45-54</td>
<td>44%</td>
</tr>
<tr>
<td>55-64</td>
<td>21%</td>
</tr>
<tr>
<td>65 or older</td>
<td>6%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 4.5. Age by Gender
The pre-swim survey was also used to gauge respondent’s educational experience. Level of education is likely to have an impact on knowledge, attitude, and behavior. It is logical to assume that visitors with high levels of education and advanced degrees may score higher on the knowledge section of the survey, purely due to more frequent exposure to information. It is also possible that this highly educated subset of the population may have an increased awareness for conservation and environmentally related issues. This increased awareness is likely to impact both attitudes and behaviors. Berberoglu et al (2014), states that an increase in knowledge leads to increased awareness, improved attitude, and change in behavior. Erdogan (2015), makes a similar claim, stating that the combination of knowledge with awareness is necessary for developing environmental action skills.

Most respondents (60%) were at least college graduates. Over half of those respondents had a graduate degree. See table 6 below for a distribution of levels of education among respondents. This high proportion of college educated respondents may have been influenced by the financial cost of attending Dolphins Plus. Highly educated individuals generally have higher incomes and would be financially able to take their families to Dolphins Plus. Lower income groups may not have the opportunity due to financial constraint.

<table>
<thead>
<tr>
<th>Table 4.6. What is the highest level of education you have completed?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level of Education</strong></td>
</tr>
<tr>
<td>College graduate (University)</td>
</tr>
<tr>
<td>Grade school</td>
</tr>
<tr>
<td>Graduate degree (Master's, Law, Medicine, PhD, etc.)</td>
</tr>
<tr>
<td>High school graduate</td>
</tr>
<tr>
<td>Some graduate school</td>
</tr>
<tr>
<td>Some high school (Secondary school)</td>
</tr>
<tr>
<td>Technical school, associate degree, or other post-secondary diploma</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Pre-swim respondents were also asked to identify their primary language, English or other. This question served as a proxy for nationality. Dolphins Plus receives a large number of international visitors. Most respondents (58%) were native English speakers. Most other languages selected were traditionally European languages including, German, Danish, Dutch, French, Swedish and others. I expect to see some differences in knowledge, attitudes, and behaviors of native English speakers vs those whose primary language is not English. For the purpose of this study we will assume that the English group is largely American, and the other group is largely European. It is possible that a potential language barrier may exist for foreign respondents and those whose primary
language is not English. This language barrier could impact visitor responses and cause misunderstanding and confusion. The surveys were written in a way to be as clear as possible but could still be misconstrued if the respondent’s first language is not English. It is also possible that foreign respondents knowledge, attitudes, and behaviors could differ from American respondents due to cultural differences.

<table>
<thead>
<tr>
<th>Languages</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>58.0%</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>42.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

The demographic portion of the Pre-Swim survey provides an in-depth look at the types of visitors coming to Dolphins Plus. Many factors play a role in determining a person’s knowledge, attitudes, and behaviors. Understanding the socio-demographic makeup of the study population will give insight to the motivations and reasons behind a visitor’s knowledge, attitudes, and behaviors. The majority of respondents to the Pre-Swim survey were women. Past studies have shown women to have more positive attitudes towards environmental issues. (Digby, 2012) Gender could play a role in determining conservation related knowledge, attitudes, and behaviors. Most visitors were between the ages of 45-54. This middle-aged visitor is likely to be educated and be potentially more knowledgeable, and confident in their beliefs and values than younger age groups. I would predict this group to exhibit higher levels of knowledge than younger respondents. The average respondent is also highly educated. The majority of respondents are at least college graduates. Many respondents (32%) hold graduate degrees. This high level of education is likely to impact not only knowledge, but attitudes and behaviors as well. With knowledge comes awareness. Those visitors who are aware of environmental issues may be more likely to take an interest in the environment and exhibit positive environmental behaviors. Lastly it was determined that the majority (58%) of respondents are native English speakers. There is still a large percentage of foreign visitors to Dolphins Plus. Foreign visitors and non-native English speakers are likely to experience a language barrier while completing the surveys and also while participating in their program at Dolphins Plus. This language barrier, along with cultural differences are likely to impact respondent’s knowledge, attitudes, and behaviors.

This section provided a detailed look at what types of people are coming to Dolphins Plus and their possible motivations for doing so. The average respondent would be a female between the ages of 45 and 54 and a native English speaker. She would be a frequent zoo visitor and a first-time participant in a swimming with dolphins program. The average visitor would also have a college degree and a love for animals. These socio-demographic factors and past experiences are likely to impact the knowledge, attitudes, and behaviors of the survey respondents. Digby (2012), conducted a study looking at
influences of socio-demographic factors on adult environmental behaviors. She found that the baby boomer age demographic to have higher environmental behavior scores than other age groups. I predict this study may see a similar outcome. Digby also found respondents with at least a four-year college degree to have higher scores. I would predict a similar trend for this study. Most respondents to our survey had at least a college degree. I expect this group of highly educated visitors to not only exhibit more environmental behaviors but to also exhibit higher levels of knowledge and more positive environmental attitudes. The 2012 study also found females to be more likely to exhibit environmental behaviors. I am interested to see if this predictor of behavior holds true for this study. (Digby, 2012)

3. Conservation Attitudes

This section analyzes and discusses the attitudinal section of the pre-swim survey. Pre-existing conservation attitudes will be described. This section will also look at which type of attitudinal questions were asked and how visitor demographic factors and past experiences influenced their preexisting attitudes.

Although environmental behaviors cannot be attributed to one single variable, past studies have shown that attitude plays a vital role in determining behavior (Erdogan, 2015), while attitudes themselves reflect an interaction of underlying beliefs and values. The subsequent information will also give insight to which demographics may have an impact on changes in knowledge, attitude, and behavior following the post-swim survey.

This study used a number of belief and values statements to evaluate visitor “attitudes” about conservation, marine life, environmentalism, and captive animals. Respondents were asked to indicate the extent to which they agreed or disagreed with 16 statements on a 5-point Likert scale. Lower scores represent disagreement with the attitudinal statements, while high scores indicate agreement with the statements.

The following attitudinal questions were asked to gauge preexisting attitudes prior to their visit. (table 8) Two subscales were created by combining related Likert scale items. The Conservation Subscale Score serves as a proxy for overall baseline conservation attitudes. The Personal Efficacy subscale serves as a proxy for overall personal power and responsibility to impact the environment. The Conservation Subscale Score and the Personal Efficacy Subscale Score were created by adding together the scores of the following items in order to create cumulative variables for analysis purposes:
<table>
<thead>
<tr>
<th>Survey item</th>
<th>Average Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control statements assessing respondents baseline conservation attitudes</strong></td>
<td></td>
</tr>
<tr>
<td>Water conservation is an important issue in my community.</td>
<td>4</td>
</tr>
<tr>
<td>I consider energy efficiency when buying new electrical products.</td>
<td>4</td>
</tr>
<tr>
<td>I would be willing to pay higher prices for common household</td>
<td>4</td>
</tr>
<tr>
<td>products to protect the environment.</td>
<td></td>
</tr>
<tr>
<td><strong>Statements assessing attitudes about the efficacy of personal action and</strong></td>
<td></td>
</tr>
<tr>
<td>conservation¹</td>
<td></td>
</tr>
<tr>
<td>There is no point in doing what I can for the environment unless others</td>
<td>2</td>
</tr>
<tr>
<td>do the same.</td>
<td></td>
</tr>
<tr>
<td>It is too difficult for someone like me to help protect the oceans.</td>
<td>2</td>
</tr>
<tr>
<td>My daily actions affect dolphins and the ocean.</td>
<td>3</td>
</tr>
<tr>
<td><strong>Statements assessing attitudes toward captive and wild animals</strong></td>
<td></td>
</tr>
<tr>
<td>Interacting with marine mammals in the wild has little impact on those</td>
<td>2</td>
</tr>
<tr>
<td>animals.</td>
<td></td>
</tr>
<tr>
<td>It is better for an animal to be born into captivity than taken from the</td>
<td>3</td>
</tr>
<tr>
<td>wild.</td>
<td></td>
</tr>
<tr>
<td>I believe observing whales and dolphins in the wild is less harmful to</td>
<td>4</td>
</tr>
<tr>
<td>their populations than keeping them in captivity.</td>
<td></td>
</tr>
<tr>
<td>Stranded marine mammals that cannot be returned to the wild should</td>
<td>2</td>
</tr>
<tr>
<td>be euthanized (put down), rather than placed in marine mammal</td>
<td></td>
</tr>
<tr>
<td>parks.</td>
<td></td>
</tr>
<tr>
<td><strong>Statements assessing attitudes about role of zoos and aquariums</strong></td>
<td></td>
</tr>
<tr>
<td>People who visit zoos and aquariums acquire knowledge about animals and</td>
<td>4</td>
</tr>
<tr>
<td>conservation while being entertained.</td>
<td></td>
</tr>
<tr>
<td>Zoos, aquariums, and animal parks inspire me to help conserve</td>
<td>4</td>
</tr>
<tr>
<td>nature and wildlife.</td>
<td></td>
</tr>
<tr>
<td><strong>Statements assessing attitudes toward marine conservation</strong></td>
<td></td>
</tr>
<tr>
<td>Whales and dolphins do not need to be protected.</td>
<td>1</td>
</tr>
<tr>
<td>The ocean is so large, it will take many generations before damage</td>
<td>2</td>
</tr>
<tr>
<td>from humans is obvious.</td>
<td></td>
</tr>
<tr>
<td>Marine habitats are threatened everywhere in the world.</td>
<td>4</td>
</tr>
<tr>
<td>It is important to allow native peoples, such as the Alaskan Inuits, to</td>
<td>3</td>
</tr>
<tr>
<td>hunt whales for food and to support their culture.</td>
<td></td>
</tr>
</tbody>
</table>
Conservation Subscale
1. Water conservation is an important issue in my community.
2. I consider energy efficiency when buying new electrical products.
3. I would be willing to pay higher prices for common household products to protect the environment.

Personal Efficacy Subscale
1. There is no point in doing what I can for the environment unless others do the same.
2. It is too difficult for someone like me to help protect the oceans.

General Results
The conservation attitude findings show that generally, visitors are coming into their visit at Dolphins Plus with positive attitudes. The baseline conservation subset of attitudinal items showed that respondents, on average, agree with the statements. The personal efficacy items included more neutral responses but were still fairly positive. On average, respondents disagreed with the idea that they cannot do anything to impact the environment. The questions evaluating respondent’s opinions on captive animals showed more variation. This is one area that may have room for “improvement” following their swim experience. On average, respondents had a pre-disposed positive view of the roles of zoos and aquariums. It is likely that people choosing to attend Dolphins Plus hold zoos and aquariums in high regard. Otherwise they would not be likely to choose to attend Dolphins Plus. Attitudes towards marine conservation were generally positive. There was some neutral loading regarding the question pertaining to allowing Alaskan Inuits to hunt whales. This section may see some “improvement” in the Post-Swim survey as well. The conservation attitudes reported in the Pre-Swim survey are positive, on average, but there is room for bettering these scores. Many items reported neutral loading.

Associations with Gender, Nationality, and Level of Education
To evaluate bivariate relationships relating to preexisting attitudes, crosstabs were run. Crosstabs were run on all intervening variables with the attitudinal items. Most of the potential relationships between demographic characteristics were not statistically significant. Kendall’s tau was used to determine that age did not have a significant impact on attitude. Some distinctive associations between gender, nationality, and level of education were found.

Gender-- The literature suggests that women generally have a greater level of environmental concern than men. (Mohai, 1992) (Digby, 2012) This finding held partially true for this study. Gender influenced respondent’s belief that observing whales and dolphins in the wild is less harmful to their populations than keeping them in captivity; females were more likely to agree with this statement. Gender was also found to influence agreement with the statement “There is no point in doing what I can for the environment unless others do the same.” Females were more likely to strongly disagree with this statement. Gender had a significant relationship with the belief that zoos,
aquariums, and animal parks inspire the respondent to help conserve nature and wildlife. Females were more likely to agree. Women were also more likely to disagree that it is too difficult for them to help protect the oceans. Men were more likely to agree that whales and dolphins do not need protection and that non-releasable, stranded marine mammals should be euthanized rather than placed in captivity. All associations listed below (table 9) between gender and attitudinal items were determined to be significant using the Mann-Whitney U test. The Mann-Whitney U test compares differences between two independent groups. The dependent variable must be ordinal or continuous. In this case, the dependent variables are ordinal Likert scale items. (Mann-Whitney U test using SPSS Statistics, 2013)

Lastly, gender was found to have an impact on the Personal Efficacy Subscale Score. Females were more likely than males to report low scores, meaning that females were more likely to believe that their personal actions have an impact on the environment. Females are, on average, scoring higher than men on some conservation attitudinal items. Because of these high scores there may be little room for improvement following their experience at Dolphins Plus. There is a pattern seen in the significant associations between gender and attitude. Women, on average, are more likely to report positive environmental and conservation related attitudes. Men, on the other hand, are more likely to doubt their power to impact the environment. These results are in line with the findings of past research. (Mohai, 1992) (Digby, 2012)

**Nationality--Language** was also found to be an intervening variable that had a significant effect on respondent’s preexisting attitudes. Again, the Mann-Whitney U test was used to determine significance between language/nationality and ordinal, attitudinal variables. Native English speakers were compared to respondents with a primary language other than English. Language served as a proxy for nationality. It was assumed that the English language group is mainly American, and the Other language group is largely foreign. It was found that language/nationality affected the following statement. “My daily actions affect dolphins and the oceans.” The English language group was found to be more likely to agree with this statement and less likely to have a neutral stance. The English language group was also more likely to agree that zoos, aquariums, and animal parks inspire the respondent to help conserve nature and wildlife. The idea that zoos promote knowledge gain was more agreed upon by the English language group as well.

The Other language group exhibited more negative conservation behaviors. The Other language group was more likely to agree that interacting with wild marine mammals has little impact on the animals. They also were more likely to agree that there isn’t a point in doing their part for the environment unless others do as well. This group did not exhibit high levels of confidence in their power to impact the environment. Lastly, the Other language group was more likely to agree that non-releasable marine mammals should be euthanized rather than placed in captivity.
Table 4.9. Statistically Significant Associations Between Gender and Attitudinal Responses

<table>
<thead>
<tr>
<th>Survey Statement</th>
<th>Mean Score and General Relationship Between Variables</th>
<th>Statistical Test Used and p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;I believe observing whales and dolphins in the wild is less harmful to their populations then keeping them in captivity.&quot; (scale = 1-5)</td>
<td>Females more likely to agree. F = 3.7 M = 3.4</td>
<td>Mann-Whitney U p = 0.019</td>
</tr>
<tr>
<td>&quot;There is no point in doing what I can for the environment unless others do the same.&quot; (scale = 1-5)</td>
<td>Females more likely to disagree strongly. F = 1.8 M = 2.2</td>
<td>Mann-Whitney U p = 0.004</td>
</tr>
<tr>
<td>&quot;Zoos, aquariums, and animal parks inspire me to help conserve nature and wildlife.&quot; (scale = 1-5)</td>
<td>Females more likely to agree. F = 4.1 M = 3.8</td>
<td>Mann-Whitney U p = 0.009</td>
</tr>
<tr>
<td>&quot;It is too difficult for someone like me to help protect the oceans.&quot; (scale = 1-5)</td>
<td>Men more likely to agree. F = 1.9 M = 2.3</td>
<td>Mann-Whitney U p = 0.003</td>
</tr>
<tr>
<td>&quot;Whales and dolphins do not need to be protected.&quot; (scale = 1-5)</td>
<td>Men more likely to agree. F = 1.3 M = 1.5</td>
<td>Mann-Whitney U p = 0.016</td>
</tr>
<tr>
<td>&quot;Stranded marine mammals that cannot be returned to the wild should be euthanized (put down), rather than placed in marine mammal parks.&quot; (scale = 1-5)</td>
<td>Men more likely to agree. F = 1.5 M = 1.9</td>
<td>Mann-Whitney U p = 0.002</td>
</tr>
<tr>
<td>Personal Efficacy Subscale Score (Scale = 1-10)</td>
<td>Females more likely to have a score of 2. F = 3.7 M = 4.4</td>
<td>Mann-Whitney U p = 0.002</td>
</tr>
</tbody>
</table>

Finally, it was determined that language has a significant effect on the Personal Efficacy Subscale Score. The English language group was more likely to have a low score, of 3 or under, indicating that the native English speakers have a greater feeling of personal responsibility for environmental issues and solutions. This finding I thought to be counterintuitive. I would have predicted that the foreign group would have more environmentally minded attitudes than the American group. There is a stereotypical idea that major European nations are more environmentally progressive than American. This discrepancy could have partly been due to the Other language group having more difficulty reading and understanding the survey material due to a potential language barrier. Cultural differences between the two groups may also account for differences in environmental attitudes.
<table>
<thead>
<tr>
<th>Survey Statement</th>
<th>Mean Score and General Relationship between Variables</th>
<th>Statistical Test Used and p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;My daily actions affect dolphins and the ocean.&quot; (scale = 1-5)</td>
<td>The English language group is more likely to agree and less likely to be neutral. English: 3.6 Other: 3.2</td>
<td>Mann Whitney U p=0.004</td>
</tr>
<tr>
<td>&quot;Zoos, aquariums, and animal parks inspire me to help conserve nature and wildlife.&quot; (scale = 1-5)</td>
<td>The English language group is more likely to agree and less likely to be neutral. English: 4.2 Other: 3.8</td>
<td>Mann Whitney U p=0.001</td>
</tr>
<tr>
<td>&quot;Interacting with marine mammals in the wild has little impact on those animals.&quot; (scale = 1-5)</td>
<td>The Other language group is more likely to agree. English: 2.2 Other: 2.8</td>
<td>Mann Whitney U p=0.000</td>
</tr>
<tr>
<td>&quot;There is no point in doing what I can for the environment unless others do the same.&quot; (scale = 1-5)</td>
<td>The Other language group is more likely to agree. English: 1.8 Other: 2.1</td>
<td>Mann Whitney U p=0.036</td>
</tr>
<tr>
<td>&quot;People who visit zoos and aquariums acquire knowledge about animals and conservation while being entertained.&quot; (scale = 1-5)</td>
<td>The English language group is more likely to agree. English: 4.2 Other: 3.8</td>
<td>Mann Whitney U p=0.001</td>
</tr>
<tr>
<td>&quot;Stranded marine mammals that cannot be returned to the wild should be euthanized (put down), rather than placed in marine mammal parks.&quot; (scale = 1-5)</td>
<td>The Other language group is more likely to agree. English: 1.4 Other: 2.0</td>
<td>Mann Whitney U p=0.000</td>
</tr>
<tr>
<td><strong>Personal Efficacy Subscale Score</strong> (Scale = 1-10)</td>
<td>English language group more likely to have a score of 3 or under. English: 3.8 Other: 4.3</td>
<td>Mann Whitney U p=0.035</td>
</tr>
</tbody>
</table>

**Education**--Level of education was also found to impact visitor’s preexisting attitudes. Education increases knowledge and awareness which in turn affects attitude. (Erdogan, 2015) It was determined that respondents with a graduate degree were most likely to agree that their daily actions affect dolphins and the ocean. The graduate school group was also most likely to agree with the following statement, "I would be willing to pay higher prices for common household products to protect the environment." Higher levels of education generally correlate with higher income levels. Respondents who are highly educated and environmentally aware are logically going to be more likely to
financially support environmental causes through their purchases. Level of education was also found to impact the Personal Efficacy Subscale Score. The least educated respondent’s reported lower levels of personal efficacy regarding their own power to impact the environment. These findings suggest that with education comes environmental awareness and a higher desire to positively impact the environment.

The first two attitudinal items described in the following table were tested for association with level of education using the Kendall’s tau-b statistical test. Kendall’s tau-b is nonparametric measure of association. This test shows the strength and direction of the association between two variables, one of which is an ordinal variable. Both the attitudinal ranking variables and level of education are ordinal variables. This test shows that there is a positive association between increasing level of education and level of agreement with the attitudinal items listed below. (Kendall’s tau-b using SPSS Statistics, 2013) The Anova statistical test was chosen to evaluate the association between level of education and the Personal Efficacy Subscale Score. The one-way Anova determines significant differences between the means of groups. An F-test was used. The Anova determined that at least one pair was significantly different. Further statistical analysis would be needed to isolate the pair(s). This test has shown that the Personal Efficacy Subscale Scores are statistically significant among different levels of education. The table below shows that higher levels of education generally have lower scores, indicating higher levels of personal efficacy. (One-way ANOVA, 2013)

**Associations with Level of Interest in Learning and Prior Animal Park Experiences**

It was determined that frequency of past zoo visits in the past two years had an impact on the Personal Efficacy Score. This association was determined to be significant using a one-way Anova. The more than 6 visits group was more likely to have a low score, indicating that frequent zoo visitors are more aware of their personal impacts on the environment and more confident that their actions can make a difference. The outcome of the post swim survey will add insight to this finding and help to determine if visits to zoos, aquariums, and animal parks do influence visitor attitudes and if that influence is positive. It was determined, using the Mann Whitney U test, that past swimming with dolphins experience did not have any significant effect on conservation attitudes.

Level of interest in learning about marine life and oceans significantly impacted multiple attitudinal items on the Pre-Swim survey. (table 13) Generally, increasing levels of interest correlated with increasingly positive conservation attitudes. These correlations were determined using Spearman’s rho. Spearman’s rho is “a non-parametric measure of strength and direction of association that exists between two variables measured on at least an ordinal scale.” (Spearman’s Rank Order Correlation using SPSS Statistics, 2013) It was found that highly interested respondents were more likely to agree with the statement that marine habitats are threatened. A positive correlation was also found between being willing to pay higher prices for household goods to protect the environment and level of interest in learning. Statements regarding negative attitudes
towards personal efficacy were seen to be negatively correlated with increasing level of interest in learning. It was determined that highly interested respondents are more likely to disagree with the idea that it is too difficult for them to protect the oceans and that there is no point in doing what they can for the environment.

<table>
<thead>
<tr>
<th>Table 4.11. Statistically Significant Associations between Education and Attitudinal Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of Education</td>
</tr>
<tr>
<td>Grade School</td>
</tr>
<tr>
<td>Some high school (Secondary school)</td>
</tr>
<tr>
<td>High school graduate</td>
</tr>
<tr>
<td>Technical school, associate degree, or other post-secondary diploma</td>
</tr>
<tr>
<td>College graduate (University)</td>
</tr>
<tr>
<td>Some graduate school</td>
</tr>
<tr>
<td>Graduate degree (Master's, Law, Medicine, PhD, etc.)</td>
</tr>
<tr>
<td>Statistical test and p-value</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 4.12. Statistically Significant Associations between Past Experiences and Attitudinal Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey Statement</td>
</tr>
<tr>
<td>Do past zoo visits affect the Personal Efficacy Subscale Score? (Scale=0-15)</td>
</tr>
</tbody>
</table>
Lastly, it was found that level of interest in learning about marine life and oceans significantly impacted the Personal Efficacy Subscale Score. It was found that lower Personal Efficacy Scores correlated with higher percentages of highly interested respondents (80-100 on interest slider). It is logical that respondents who are interested in learning about marine life and oceans will have more positive environmental attitudes. This highly interested subset of the study population will be a group of interest throughout this study. I would also be interested to further analyze this group in the Post-Swim findings.

Potential associations between attitudinal items and prior SWD experience was also analyzed. It was found that prior swimming-with-dolphins experiences had no significant impact on any attitudinal items on the Pre-Swim survey. Mann-Whitney U, a test used to compare differences between independent groups, was used to determine significance. (Mann-Whitney U Test using SPSS Statistics, 2013)

<table>
<thead>
<tr>
<th>Survey Statement</th>
<th>General Relationship between Variables</th>
<th>Statistical Test Used and p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Marine habitats are threatened everywhere in the world.&quot; (scale =1-5)</td>
<td>Positive correlation between level of interest and level of agreement</td>
<td>Spearman’s rho p=0.000</td>
</tr>
<tr>
<td>&quot;I would be willing to pay higher prices for common household products to protect the environment.&quot; (scale = 1-5)</td>
<td>Positive correlation between level of interest and level of agreement</td>
<td>Spearman’s rho p=0.006</td>
</tr>
<tr>
<td>&quot;There is no point in doing what I can for the environment unless others do the same.&quot; (scale = 1-5)</td>
<td>Negative correlation between level of interest and level of agreement</td>
<td>Spearman’s rho p=0.05</td>
</tr>
<tr>
<td>&quot;It is too difficult for someone like me to protect the oceans.&quot; (scale = 1-5)</td>
<td>Negative correlation between level of interest and level of agreement</td>
<td>Spearman’s rho p=0.003</td>
</tr>
<tr>
<td>Personal Efficacy Subscale Score (Scale=1-10)</td>
<td>Negative correlation between level of interest and Personal Efficacy Subscale Score</td>
<td>Spearman’s rho p=0.005</td>
</tr>
<tr>
<td>Conservation Subscale Score (Scale=1-15)</td>
<td>Positive correlation between level of interest and Conservation Subscale Score</td>
<td>Spearman’s rho p=0.011</td>
</tr>
</tbody>
</table>

Summary

This section analyzed preexisting attitudes and possible outside explanations for said attitudes. Overall, environmental attitudes were found to be generally positive. It was
found that gender, language, education, prior zoo visits, and level of interest in learning all play a role in influencing respondent’s attitudes. Women, native English speakers, highly educated respondents, frequent zoo visitors, and those interested in learning were all found to be more likely to have positive environmental attitudes. I would predict these types of visitors to also exhibit more positive environmental behaviors due to the connection between attitude and behavior. It will also be interesting to see if these same variables influence changes in attitude according to the post-swim survey.

4. Conservation Behaviors

Another function of the pre-swim survey was to gauge visitor behaviors relating to conservation and environmentalism prior to their visit to Dolphins Plus. This section describes those reported preexisting behaviors of visitors to Dolphins Plus. This section also analyzes associations between intervening factors and reported behaviors. Determining which socio-demographic characteristics and prior experiences motivate visitor behavior will add insight and understanding to the types of visitors coming to Dolphins Plus. Three questions were asked to determine respondent’s preexisting behaviors. Respondents were asked if they were a member of an environmental or conservation organization. The second behavioral item asked respondents to identify their current recycling practices. Lastly, respondents were asked to select, from an extensive list of pro-environmental activities, which activities they had pursued in the past two years. These questions are intended to give an idea of what types of environmental and conservation focused behaviors visitors to Dolphins Plus are pursuing prior to their visit.

General Results

Most (93%) respondents were not members of any environmental or conservation organization. See figure 10 for a frequency table of environmental organization membership. Second, respondents were asked to identify their current recycling practices. Most of the study population (72%) stated that they “recycle all eligible waste supported by programs where they live.” See table 14 below for a frequency table of recycling practices. The third question asked which activities they had pursued in the past two years to uphold commitment and connection to nature, wildlife, conservation, and/or the environment. A list of 16 common activities was provided for respondents to select from. See table 15 below for a frequency table of pursued activities.

An Activity Score was created by calculating a cumulative total of the number of activities selected by each respondent. A total of 16 environmental activities were listed. Respondents were asked to select as many activities from the list as they had pursued in the past two years. For example, if a respondent had participated in 4 of the listed activities, their Activity Score would be 4. The higher the score the more active the respondent is in environmental and conservation related behaviors. The Activity Score gives quick insight to a respondent’s commitment to nature and the environment.
### Table 4.14. Which of the following statements best describes your personal recycling practices at home?

<table>
<thead>
<tr>
<th>Recycling Practices</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>I never recycle.</td>
<td>2%</td>
</tr>
<tr>
<td>I occasionally recycle.</td>
<td>8%</td>
</tr>
<tr>
<td>I recycle all eligible waste supported by programs where I live.</td>
<td>72%</td>
</tr>
<tr>
<td>I recycle all eligible waste when access to receptacles is convenient.</td>
<td>18%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Table 4.15. In the past two years, what activities have you pursued in efforts to uphold your commitment/connection to nature, wildlife, conservation, and/or the environment?

<table>
<thead>
<tr>
<th>Activities</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attended educational events</td>
<td>12%</td>
</tr>
<tr>
<td>Contacted government officials</td>
<td>4%</td>
</tr>
<tr>
<td>Donated money to organizations</td>
<td>42%</td>
</tr>
<tr>
<td>Educated friends, family, or children</td>
<td>42%</td>
</tr>
<tr>
<td>Helped with a community, park, or beach cleanup</td>
<td>18%</td>
</tr>
<tr>
<td>Joined a rally or protest</td>
<td>1%</td>
</tr>
<tr>
<td>Made sustainable seafood choices</td>
<td>30%</td>
</tr>
<tr>
<td>Reduced fertilizer or pesticide use</td>
<td>34%</td>
</tr>
<tr>
<td>Volunteered for an organization or event</td>
<td>7%</td>
</tr>
<tr>
<td>Visited a national park</td>
<td>60%</td>
</tr>
<tr>
<td>Recycled</td>
<td>83%</td>
</tr>
<tr>
<td>Pursued a higher level of education in the field of conservation</td>
<td>2%</td>
</tr>
<tr>
<td>Planted a home garden, trees</td>
<td>42%</td>
</tr>
<tr>
<td>Shared stories I connect with on social media</td>
<td>16%</td>
</tr>
<tr>
<td>Volunteered at a local non-profit with a conservation mission</td>
<td>4%</td>
</tr>
<tr>
<td>Other</td>
<td>6%</td>
</tr>
</tbody>
</table>
Associations with Gender, Language/Nationality, Education, and Prior Experiences

To evaluate the potential relationships between intervening variables and preexisting behaviors crosstabs were again run. Gender, age, language, education, past zoo visits, prior swimming with dolphins experience, and level of interest in learning were run against the three behavioral items. Most potential relationships were not statistically significant. Age was determined to have no significant affect using Kendall’s tau. Past swimming with dolphins experience was determined to have no significant affect using Mann Whitney U. Table 16 summarizes the relationships that were statistically significant.

<table>
<thead>
<tr>
<th>Association</th>
<th>Mean Scores and General Relationship Between Variables</th>
<th>Statistical Test Used and p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does gender affect the Activity Score? (scale = 0-14)</td>
<td>Females are more likely to have a higher Activity Score. F: 4.3 M: 3.5</td>
<td>Mann Whitney U p=0.007</td>
</tr>
<tr>
<td>Does language affect the activity score? (scale =0-14)</td>
<td>The English language group is more likely to have a higher Activity Score. English: 4.4 Other: 3.4</td>
<td>Mann Whitney U p=0.001</td>
</tr>
<tr>
<td>Does education affect the activity score? (Scale=0-14)</td>
<td>The graduate degree group is most likely to have a score of 9 or above than other groups. Grade School: 2.5 Some high school: 2.0 High school graduate: 3.4 Technical School, etc.: 4.1 College graduate: 4.2 Some graduate school: 3.6 Graduate degree: 4.3</td>
<td>Kendall's tau p=0.05</td>
</tr>
<tr>
<td>Do past zoo visits affect the Activity Score? (scale = 0-14)</td>
<td>The more than 6 visits group was most likely to have higher scores. None: 3.2 Once: 3.2 2-3 visits: 3.7 4-6 visits: 5.0 More than 6 visits: 5.9</td>
<td>Kendall's tau p=.000</td>
</tr>
<tr>
<td>Does level of interest in learning affect the Activity Score? (scale = 0-14)</td>
<td>Positive correlation between level of interest in learning and Activity Score.</td>
<td>Spearman’s rho p=0.000</td>
</tr>
</tbody>
</table>
Gender was found to significantly affect the Activity Score. It was found that on average, women exhibited a higher number of positive environmental activities than men did. Due to women reporting more positive conservation attitudes it is logical to infer that these positive attitudes could play a role in inspiring pro-environmental behavior. This association was tested for significance using the Mann-Whitney U test.

It was also determined that language influenced the Activity Score. This association was also tested for significance using the Mann-Whitney U test. The English language group was found to be more likely to have a higher score. This indicates that the respondents whose primary language is English pursued a higher number of conservation and environmentalism related activities throughout the past two years than non-native English speakers. The “Other” language group, as previously stated, is assumed to be largely composed of international visitors. This indicated that these respondents are not only dealing with a potential language barrier but with cultural differences as well. These cultural differences may be evident in the Activity Score. It is possible that some of the activities listed are more popular activities and behaviors for American respondents rather than international respondents. For example, visiting a national park is a common past time for Americans. This may not be true for foreign visitors. Due to the English group having a lower Personal Efficacy score I would expect this group to also have a higher Activity Score. Holding the belief that your personal actions affect the environment would logically lead you to exhibit more environmentally conscious behaviors.

Education was also found to affect the Activity Score. The group with the highest level of education, a graduate degree, was found to be more likely to have a higher activity score. It is not surprising that the most highly educated respondents participated in a higher number of environmental and conservation related activities. This again, comes back to education leading to increased awareness and more positive attitudes regarding the environment. The higher education group was found to have a lower Personal Efficacy scores which logically correlates with a higher Activity Score. This relationship was determined to be significant using Kendall’s tau.

It was also determined that past zoo visits also influence the Activity Score. Respondents who had visited a zoo, aquarium, or animal park more than 6 times in the past two years were more likely to have higher Activity Scores. Again, this group also had the lowest Personal Efficacy scores. A correlation between personal efficacy and environmental behavior is becoming potentially apparent. This potential relationship was evaluated using a crosstabulation. The inverse relationship between the Personal Efficacy Score and the Activity Score was found to be significant using Kendall’s tau.

Lastly, level of interest in learning about marine life was found to significantly affect the Activity Score. Higher levels of interest in learning correlated with higher Activity Scores. Respondents who are coming to Dolphins Plus with a desire to learn are more likely to exhibit a wide range of positive environmental behaviors. Respondents reporting a high interest in learning generally exhibit more positive conservation attitudes.
along with more pro-environmental behaviors. Spearman’s rho was used to determine significance of this relationship.

Activity Score was the only behavior item that was found to be significantly affected by intervening variables. No significant relationships were found between any intervening variables and recycling practices. I believe that better proxies for environmental behaviors exist, due to recycling becoming more mainstream and convenient in recent years. This could explain why no socio-demographic factors had a significant impact on recycling practices. It was also found that there were no relationships between intervening variables and conservation/environmental organization membership. This could in part be due to only 7% of the study population being members of any conservation/environmental organization.

This section looked at behaviors exhibited by Dolphins Plus visitors prior to their program. It was found that language, education and past zoo visits all influence preexisting environmental behaviors. Women, native English speakers, highly educated respondents, frequent zoo visitors, and respondents highly interest in learning about marine life were all found to partake in a higher number of activities relating to wildlife, nature, conservation or the environment. These demographics were also found to exhibit more positive attitudes. Based upon past literature this correlation between attitude and behavior is not surprising. (Erdogan, 2015) Attitude is one of many factors that influences human behavior.

5. Knowledge

This section will describe and analyze the knowledge items of the Pre-Swim survey. The knowledge section included 11 questions, 1 of which was left out of the analysis due to having different wording in the Post-Swim survey. These 10 questions were analyzed, and each respondent was given a “Quiz Score.” This score represents the percentage of knowledge items the respondent answered correctly. These same 10 items will be analyzed in the Post-Swim survey and the results of the two surveys will be compared to determine knowledge gain or loss.

General Results

The most common Quiz Score range was 51-61% correct, with 29% of the respondent’s falling in this range. An Unsure Score was also calculated by calculating a cumulative number of questions where the respondent selected “unsure.” 30% of respondents reported an Unsure Score between 30-40% unsure. Table 15 below provides a list of all Pre-Swim knowledge items with corresponding average correct, unsure, and incorrect scores.

Figure 1 below depicts the distribution of Quiz Scores. Figure 2 below depicts the distribution of Unsure Scores. Based upon the past literature I would predict the Quiz Scores to increase in the Post-Swim survey. I would also predict that the Unsure Scores
may decrease due to a potential better understanding of marine conservation related topics, if the experience at Dolphins Plus truly does impact visitor knowledge. Multiple studies have reported an increase in knowledge following a zoological experience. Harley et al., (2010) found that visitor knowledge about dolphins and conservation increased after watching a dolphin informational presentation at Disney’s The Seas. Below is the set of quiz questions provided in the knowledge section of the pre-swim survey. Some knowledge items used in the Pre-Swim survey showed high correct scores. It may be possible that some questions chosen are already widely understood by adult visitors to Dolphins Plus. Dolphins Plus may want to consider including more difficult questions to better gauge preexisting knowledge.

<table>
<thead>
<tr>
<th>Quiz Question</th>
<th>Average Correct Score</th>
<th>Average Unsure Score</th>
<th>Average Incorrect Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1. Which of the following is the top threat to dolphins worldwide?</td>
<td>79%</td>
<td>15%</td>
<td>3%</td>
</tr>
<tr>
<td>Q2. Dolphin and whale strandings are primarily caused by sonar activities?</td>
<td>25%</td>
<td>64%</td>
<td>8%</td>
</tr>
<tr>
<td>Q3. Bottlenose dolphins are a threatened or endangered species?</td>
<td>8%</td>
<td>54%</td>
<td>35%</td>
</tr>
<tr>
<td>Q4. Humans and dolphins rely on some of the same resources.</td>
<td>77%</td>
<td>17%</td>
<td>2%</td>
</tr>
<tr>
<td>Q5. Humans that live away from the coast can affect the waters where dolphins live.</td>
<td>81%</td>
<td>15%</td>
<td>0%</td>
</tr>
<tr>
<td>Q6. Which of the following are leading causes of dolphin and whale deaths worldwide?</td>
<td>9%</td>
<td>21%</td>
<td>70%</td>
</tr>
<tr>
<td>Q7. Since manatees need a source of freshwater to survive, giving manatees water from a hose keeps them healthy and safe.</td>
<td>43%</td>
<td>48%</td>
<td>7%</td>
</tr>
<tr>
<td>Q8. Which percentage of the world's population relies on fish as a primary source of protein?</td>
<td>12%</td>
<td>50%</td>
<td>33%</td>
</tr>
<tr>
<td>Q9. Worldwide, millions of jobs rely on healthy and abundant ocean resources.</td>
<td>76%</td>
<td>17%</td>
<td>3%</td>
</tr>
<tr>
<td>Q10. In general, bottlenose dolphins in captivity live as long as those in the wild.</td>
<td>22%</td>
<td>46%</td>
<td>29%</td>
</tr>
</tbody>
</table>
Associations with Age and Level of Interest

To evaluate bivariate relationships with intervening variables and knowledge items, crosstabs were run. Gender, age, language, education, past zoo visits, prior swimming with dolphins experience, and level of interest in learning were run against the Quiz Scores and Unsure Scores. Most relationships analyzed were found to not be statistically significant. Gender, language, and prior swimming with dolphins experience were found to not significantly impact knowledge using Mann Whitney U. A one-way Anova was used to determine that education and past zoo visits did not significantly impact knowledge.
Statistically significant results are displayed in table 18 below. It was found that age had an effect on Quiz Scores. The 25-34 age group scored highest on the knowledge items. Literature regarding the impact of age on environmental attitudes and knowledge is somewhat inconclusive. Some studies have shown that older individuals, who lived through environmental catastrophes such as Three Mile Island tend to have higher levels of environmental knowledge and awareness. Other studies have shown that environmental concern and knowledge is higher among younger generations. Digby, 2012 cited a study conducted in Taiwan that found that younger Taiwanese community leaders reported higher levels of environmental knowledge. (Digby, 2012) The impacts of age on environmental knowledge should be explored further in the future study to be conducted by Dolphins Plus. The one-way Anova was used to determine significance of this relationship between age and Quiz Scores.

Level of interest in learning about marine life was also found to impact Quiz Scores. Respondents who reported high levels of interest in learning were more likely to score highly on the knowledge section of the Pre-Swim survey. Again, this group of respondents who are highly interested in learning prior to coming to Dolphins Plus is proving to be a group of interest for this study. This group has reported positive conservation attitudes, high numbers of pro-environmental activities, and high levels of reported knowledge. Kendall’s tau was used to determine significance of the relationship between level of interest in learning and Quiz Scores.

The same tests for association were run with Unsure Scores. It was determined that age had a significant effect on the Unsure Score. The 25-34 age group reported the lowest Unsure Scores, indicates that the 25-34 age group, is more confident in their answers. This group is also highly educated. Most respondents (52%) have at least a college degree. 78% of this group has completed some form of post-secondary education. I would infer that with age and education comes confidence in one’s knowledge and less uncertainty with knowledge-based survey items. This group is not only reporting high knowledge scores, but they are more confident in their responses than other age groups. Again, a one-way Anova was used to determine significance of this association.

This final section described and analyzed the knowledge section of the pre-swim survey. Most respondents answered 50-60% of the knowledge items correctly and selected unsure 30-40% of the time. The scores are average and to be expected. It was also found that the Quiz and Unsure Scores were affected by age and level of interest in learning. The 25-34 age group was more likely to score higher on the knowledge section of the survey. This group is highly educated and confident in their responses. This will be a group of interest to analyze in the Post-Swim survey as well. This group may score high again on the knowledge section of the Post-Swim survey. It is also possible that this group already scored highly and there is little room for improvement. Lastly, respondents who are highly interested in learning about marine life tended to score higher on the knowledge items. I would predict a desire to learns to influence this subset of the study population’s Post-Swim knowledge scores.
Table 4.18. Statistically Significant Associations between Intervening Variables and Knowledge Responses

<table>
<thead>
<tr>
<th>Associations</th>
<th>Mean Scores and General Associations</th>
<th>Statistical Test Used and p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does age affect the Quiz Score?</td>
<td>The 25-34 group scored highest 18-24: 37% 25-34: 52% 35-44: 47% 45-54: 41% 55-64: 47% 65 and older: 48%</td>
<td>Anova p=0.04 (F=2.38)</td>
</tr>
<tr>
<td>Does level of interest in learning affect the Quiz Score?</td>
<td>High levels of interest correlated with higher Quiz Scores.</td>
<td>Kendall's tau p=0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Associations</th>
<th>Mean Scores and General Associations</th>
<th>Statistical Test Used and p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does age affect the Unsure Score?</td>
<td>The 25-34 group reported lowest Unsure Scores. 18-24: 44% 25-34: 26% 35-44: 30% 45-54: 41% 55-64:36% 65 and older: 38%</td>
<td>Anova p=0.038 (F=2.41)</td>
</tr>
</tbody>
</table>

6. Conclusion

This chapter described and analyzed the outcome of the Pre-Swim survey. The goal of the pre-swim survey was to assess the types of people who visit Dolphins Plus, their socio-demographic background, and past experiences. The purpose for gathering this background data was to gain insight about the visitor and their motivations for participating in a swimming with dolphins program. The pre-swim results also gave us insight to visitor’s preexisting knowledge, attitudes and behaviors. That insight lead to the determination of which, if any, socio-demographic factors and prior experiences had a significant impact on preexisting knowledge, attitudes, and behaviors.

The pre-swim survey determined that the majority of respondents to be female, 45-54 years old, a native English speaker, and college educated. Most respondents were also frequent zoo visitors and first-time swimming with dolphins participants. Some of
these socio-demographic factors and past experiences were found to impact the knowledge, attitudes, and behaviors of the survey respondents.

It was found that gender, language, education, prior zoo visits, and level of interest in learning about marine life all play a role in influencing respondent’s preexisting attitudes towards conservation. Women, native English speakers, highly educated respondents, frequent zoo visitors, and respondents who are highly interested in learning were all found to be more likely to have positive environmental attitudes. These demographic groups were found to be unique predictors of attitude. It is likely that these groups may also exhibit a higher level of environmental behaviors as well, if the connection between attitude and behavior is seen.

The pre-swim survey determined that gender, language, education, past zoo visits, and level of interest in learning all influence preexisting environmental behaviors. Women, native English speakers, highly educated respondents and frequent zoo visitors were all found to partake in a higher number of activities relating to wildlife, nature, conservation or the environment. These visitor groups also exhibited more positive environmental attitudes. Past literature suggests that attitude is one of a multitude of factors that determines human behavior regarding the environment. (Erdogan, 2015) If the Dolphins Plus experience can alter visitor attitudes it is possible that it can also inspire behavior change and truly impact conservation efforts.

The final section of the chapter analyzed the knowledge items. The majority of respondents answered correctly 50-60% of the time and were unsure 30-40% of the time. The 25-34 age group was a group of interest for the Pre-Swim study. This group scored higher on the knowledge items and was more confident in their responses. This may be due to this age demographic’s high level of education. Although, a statistically significant relationship between education and knowledge scores was not found. It will be interesting to see if this age group increases in knowledge or stays about the same, due to little room for improvement in scores. It was also found that a high level of interest in learning about marine life lead to higher Quiz Scores. It will be interesting to see if this association holds true in the Post-Swim survey analysis. Level of interest in learning about marine life and oceans was the only intervening factor to have a significant effect on knowledge, attitude, and behavior in the Pre-Swim survey. This group is an area of interest and will be analyzed further in the Post-Swim survey analysis. The post-swim analysis will lend much insight into these highlighted subsets of the study population and the influence their socio-demographic backgrounds and experiences impact their experience at Dolphins Plus. The goal of this study is to evaluate the impacts of the Dolphins Plus experience. In order to understand the impacts of the visit, it must be understood that outside, intervening factors can also impact knowledge, attitude, and behaviors.
Chapter 5 – Results, The Post-Swim Survey

1. Introduction and Differences from Pre-Swim Survey

This section will give an overview of the post-swim survey, its purpose, goals, and differences from the pre-swim survey. The post-swim survey was intended to gauge initial responses of visitors regarding their experience at Dolphins Plus. This information will be compared to the pre-swim survey to determine if changes in knowledge or attitude were seen. This chapter will include an analysis of potential changes in both knowledge and attitudes. Analysis of the post-swim behavior items will be left out. The post-swim survey was sent out shortly after completion of the Dolphins Plus visit (10 days). The amount of time between the visit and the completion of the post-swim survey was not enough time to truly see changes in behavior. This issue will be discussed further when giving recommendations for the future study. Demographic information and past experience will again be described and analyzed for the Post-Swim survey population. Any potential differences in demographic makeup in the two populations could influence changes in knowledge and attitude. These influences will need to be described and controlled for. The Post-Swim survey was sent to 710 recipients, all of whom also received the Pre-Swim survey. 80 recipients completed the Post-Swim survey in entirety and agreed to take the survey. Of this 80, 37 also completed the Pre-Swim survey. That subset of 37, is the Post-Swim survey sample.

The post-swim is very similar in design to the pre-swim survey but does include a few differences that could have implications for analysis. The post-swim survey begins with a new question asking for respondents to select the benefits they acquired from their visit to Dolphin’s Plus. This question will be analyzed later in the chapter. The attitude section of the post-swim survey includes new items not found on the pre-swim survey. There are 7 new attitudinal ranking items. Many of the new attitude items were used to gauge attitudes regarding Dolphins Plus and the visitor’s opinion about how institutions like Dolphins Plus can impact its visitors. These item’s will be discussed by cannot be used to compare to pre-swim attitudes. There were also slight changes in knowledge items from the pre- to post-swim surveys. The post-swim survey included one new question that will not be included in analysis. Two questions used in both surveys include different response options. One of these questions will be excluded in analysis due to the new response option being the correct option. These issues will be discussed further in the recommendation section. To design an improved survey, I would recommend keeping the pre-swim and post-swim surveys identical when writing knowledge and attitude items.
The Post-Swim survey began with an item that read, “Please select the benefits you acquired as a Dolphins Plus visitor.” The response options and their frequency are provided in the table below. The most common benefit selected was a love of animals. Quality family time, and further knowledge and understanding of marine mammals were also commonly selected benefits acquired as a Dolphins Plus visitor. Entertainment was not commonly stated as a benefit gained from visiting Dolphins Plus. This indicated that visitors to Dolphins Plus are more interested in learning about marine mammals than purely being entertained. Love of animals was the most widely selected reason for visitors coming to Dolphins Plus, closely followed by curiosity and to further knowledge. These visit purposes stated in the Pre-Swim survey line up with the stated benefits acquired as a visitor. Only 20% of Pre-Swim respondents selected entertainment as a purpose for their visit. Following their visit, only 8% of visitors selected entertainment as a benefit acquired as a Dolphins Plus visitor.

<table>
<thead>
<tr>
<th>Table 5.1. Benefits Acquired as a Dolphins Plus Visitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response Options</td>
</tr>
<tr>
<td>Entertainment</td>
</tr>
<tr>
<td>Further my knowledge and understanding of marine mammals</td>
</tr>
<tr>
<td>General curiosity</td>
</tr>
<tr>
<td>Life celebration</td>
</tr>
<tr>
<td>Love of animals</td>
</tr>
<tr>
<td>Quality family time</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

2. Visitor Characteristics

The findings from the Post-Swim survey provided additional insight into the types of people who visit Dolphins Plus. It was found that the respondent subset who answered both surveys consisted of a very similar demographic breakdown as the full Pre-Swim survey population. Again, most respondents were female, between 45 and 54 years old, and native English Speakers. The majority were highly educated with at least a college degree. Most respondents had visited a zoo or aquarium 2-3 times during the past two years and had not swam with dolphins before. Again, most respondents were swim participants, rather than observers. The only noticeable difference in the Post-Swim demographics from the Pre-Swim was a higher proportion of respondents with a graduate degree. The percentage of respondents with a graduate degree increased from 32% to 43%. The Pre-Swim results showed that higher levels of education can impact knowledge and attitudes regarding conservation. Because the Post-Swim survey population is slightly more educated I would expect the findings to show this difference with more positive attitudes and higher knowledge scores.
### Table 5.2. Visitor Characteristics Compared from Pre-Swim to Post-Swim Survey

<table>
<thead>
<tr>
<th>Visitor Characteristic Variable</th>
<th>Response</th>
<th>Pre-Swim percentage</th>
<th>Post-Swim percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swim Participant or Observer</td>
<td>Participant</td>
<td>70%</td>
<td>62%</td>
</tr>
<tr>
<td></td>
<td>Observer</td>
<td>26%</td>
<td>35%</td>
</tr>
<tr>
<td>Age</td>
<td>18-24</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>25-34</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>35-44</td>
<td>26%</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>45-54</td>
<td>44%</td>
<td>43%</td>
</tr>
<tr>
<td></td>
<td>55-64</td>
<td>10%</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>65+</td>
<td>6%</td>
<td>8%</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>38%</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>61%</td>
<td>70%</td>
</tr>
<tr>
<td>Primary Language</td>
<td>English</td>
<td>58%</td>
<td>57%</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>42%</td>
<td>43%</td>
</tr>
<tr>
<td>Highest Level of Education</td>
<td>Grade School</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>Highschool</td>
<td>15%</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>Technical School, Associates Degree</td>
<td>18%</td>
<td>16%</td>
</tr>
<tr>
<td></td>
<td>College Graduate</td>
<td>28%</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>Some Graduate School</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>Graduate Degree</td>
<td>32%</td>
<td>43%</td>
</tr>
<tr>
<td>Past Zoo Visits</td>
<td>None</td>
<td>13%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Once</td>
<td>14%</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>2-3 times</td>
<td>46%</td>
<td>54%</td>
</tr>
<tr>
<td></td>
<td>4-6 times</td>
<td>16%</td>
<td>16%</td>
</tr>
<tr>
<td></td>
<td>More than 6 times</td>
<td>9%</td>
<td>14%</td>
</tr>
<tr>
<td>Swim with Dolphins Experience</td>
<td>Yes</td>
<td>26%</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>72%</td>
<td>73%</td>
</tr>
</tbody>
</table>

### 3. Conservation Attitudes

This section will describe, analyze and discuss attitudes reported on the post-swim survey. The focus of the section will be on comparing attitude items from the pre- and post-swim surveys, looking for potential changes and the significance of those changes. Table 3 below, depicts the change in each attitudinal item from the Pre-Swim survey to the Post-Swim survey. A new variable was created by subtracting the Pre-Swim score for
each individual attitudinal item from the Post-Swim score for the same question. Calculated change in the Conservation Subscale scores and the Personal Efficacy Subscale scores are also included in Table 3. Most of the changes seen from pre to post attitude items were not significant. The items that did see significant change from pre to post will be discussed in this section.

Changes from Pre-Swim to Post-Swim

The first attitudinal item that saw significant change from pre to post was the following statement, “There is no point doing what I can for the environment unless others do the same.” The average response to this item was ranked more agreeable on the Post-Swim survey than on the Pre-Swim survey. This finding is counterintuitive to what I would expect. Respondents were slightly more likely to agree with this statement after visiting Dolphins Plus than prior to their visit. I would have expected, due to findings in past literature, that visitors would feel a sense of inspiration after their visit. This attitudinal item depicted the opposite outcome. This attitudinal ranking item, and similar items, should be analyzed further in the future study to gain insight to why respondents may feel more inspired and able to make change prior to their visit.

Following their program, visitors were less likely to agree with the following statement, “I believe observing whales in the dolphins is more harmful to their populations than keeping them in captivity.” This significant change shows that respondents are more comfortable with the idea of marine mammals being born and kept in captivity following their visit to Dolphins Plus. The idea of placing animals in captivity is likely not a significant moral issue for visitors of institutions such as Dolphins Plus. If a person were morally opposed to captive marine mammals, they would not likely voluntarily attend a dolphinarium. It is possible that some visitors may be “on the fence” regarding the ethics of captive marine mammals or have a neutral opinion. Attending Dolphins Plus, interacting with the animals, and seeing them being well cared for may cause visitors to have a more favorable opinion of keeping dolphins in captivity.

The last significant change in attitude that was seen between the Pre-Swim and Post-Swim surveys was a substantial increase in the Personal Efficacy Subscale score. Respondents reported lower levels of self-efficacy following their visit. This means that respondents, following the swimming-with-dolphins experience, were less likely to believe that they can create positive change regarding the environment and conservation. This finding is also counterintuitive. Visitors are reporting higher levels of doubt regarding their ability to positively impact the environment. This should be an area of concern for Dolphins Plus and similar institutions. This issue could made to be a focus of educational programming so that visitors leave the experience knowing that they are capable of aiding environmental and conservation efforts.
<table>
<thead>
<tr>
<th>Change in Attitudinal Items. Is the difference between the Pre-Swim score and the Post-Swim score significant? (Post Swim score – Pre-Swim Score)</th>
<th>Average Difference between Pre-Swim and Post-Swim Scores</th>
<th>Statistical Test Used and p value</th>
<th>Significant? Yes or No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water conservation is an important issue in my community</td>
<td>0.1351</td>
<td>Wilcoxon Signed Rank p=0.449</td>
<td>No</td>
</tr>
<tr>
<td>Marine habitats are threatened everywhere in the world.</td>
<td>0.2778</td>
<td>Wilcoxon Signed Rank p=0.121</td>
<td>No</td>
</tr>
<tr>
<td>I consider buying energy efficiency when buying new electrical products.</td>
<td>0.1351</td>
<td>Wilcoxon Signed Rank p=0.345</td>
<td>No</td>
</tr>
<tr>
<td>My daily actions affect dolphins and the ocean.</td>
<td>0.3514</td>
<td>Wilcoxon Signed Rank p=0.138</td>
<td>No</td>
</tr>
<tr>
<td>I would be willing to pay higher prices for common household products to protect the environment.</td>
<td>-0.3243</td>
<td>Wilcoxon Signed Rank p=0.175</td>
<td>No</td>
</tr>
<tr>
<td>There is no point in doing what I can for the environment unless others do the same.</td>
<td>2.2703</td>
<td>Wilcoxon Signed Rank p=0.000</td>
<td>Yes</td>
</tr>
<tr>
<td>Zoos, aquariums, and animal parks inspire me to help conserve nature and wildlife.</td>
<td>-0.1622</td>
<td>Wilcoxon Signed Rank p=0.418</td>
<td>No</td>
</tr>
<tr>
<td>It is too difficult for someone like me to help protect the oceans.</td>
<td>0.0811</td>
<td>Wilcoxon Signed Rank p=0.876</td>
<td>No</td>
</tr>
<tr>
<td>It is better for an animal to be born into captivity than taken from the wild.</td>
<td>0.0541</td>
<td>Wilcoxon Signed Rank p=0.769</td>
<td>No</td>
</tr>
<tr>
<td>It is important to allow native peoples, such as the Alaskan Inuits, to hunt whales for food and to support their culture.</td>
<td>-0.0541</td>
<td>Wilcoxon Signed Rank p=0.719</td>
<td>No</td>
</tr>
</tbody>
</table>
I believe observing whales and dolphins in the wild is less harmful to their populations than keeping them in captivity.

<table>
<thead>
<tr>
<th></th>
<th>Wilcoxon Signed Rank</th>
<th>p</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-0.5676</td>
<td>0.012</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Whales and dolphins do not need to be protected.

<table>
<thead>
<tr>
<th></th>
<th>Wilcoxon Signed Rank</th>
<th>p</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.0541</td>
<td>0.637</td>
<td>No</td>
</tr>
</tbody>
</table>

Stranded marine mammals that cannot be returned to the wild should be euthanized (put down), rather than placed in marine mammal parks.

<table>
<thead>
<tr>
<th></th>
<th>Wilcoxon Signed Rank</th>
<th>p</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.1892</td>
<td>0.558</td>
<td>No</td>
</tr>
</tbody>
</table>

Conservation Subscale Score

<table>
<thead>
<tr>
<th></th>
<th>Wilcoxon Signed Rank</th>
<th>p</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-0.0541</td>
<td>0.670</td>
<td>No</td>
</tr>
</tbody>
</table>

Personal Efficacy Subscale Score

<table>
<thead>
<tr>
<th></th>
<th>Wilcoxon Signed Rank</th>
<th>p</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.3514</td>
<td>0.000</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Summary

This section analyzed the differences in the attitude section of the Pre-Swim survey from the Post-Swim survey. Few significant changes in attitude were found. It was found that visitors are leaving Dolphins Plus with a more positive view of animals in captivity. This was the only “positive” change in conservation attitude seen from the Pre-Swim survey to the Post-Swim survey. An interesting and potentially counter-intuitive finding of this section is the increase in the Personal Efficacy Subscale Score. Visitors are leaving Dolphins Plus with a decreased confidence in their own personal impacts on the environment. To make a difference, the public must first believe that their actions are impactful and meaningful. Awareness and attitude both play a role in impacting environmental behavior. The following statement was found to be highly agreed upon by Post-Swim survey respondents. “There is no point in doing what I can for the environment unless others do the same.” Most respondents to the Post-Swim survey (60%) highly agreed with the statement. The idea that it is too difficult for respondents to help protect the oceans was found to be more agreeable following programming at Dolphins Plus. These findings point to one area where educational programming at Dolphins Plus could improve. I would suggest that Dolphins Plus, and similar zoological institutions, ensure that part of their educational programming include information on how the general public can positively impact the environment.

Associations with Intervening Factors

The Pre-Swim survey determined that many attitudinal items were significantly affected by intervening factors. These intervening factors included gender,
language/nationality, education, past zoo visits, and level of interest in learning about marine life. These factors were seen to impact certain attitudinal items. Tests of association were again run to determine if these same associations were seen in the Post-Swim survey responses.

**Gender**—The Pre-Swim survey findings showed significant associations between gender and the attitudinal items shown in table 4 below. According to the Pre-Swim survey women generally had more positive conservation attitudes. The findings of the Post-Swim survey do not show the same associations. Table 4 below shows that only one significant association was seen between gender and the following attitudinal items in the Post-Swim survey findings. The Post-Swim survey determined that following their visit men were still more likely to agree that stranded, non-releasable marine mammals should be euthanized rather than be placed in captivity. This is the only association between gender and attitude that remained following the Dolphins Plus experience.

<table>
<thead>
<tr>
<th>Survey Statement</th>
<th>Mean Score and General Relationship Between Variables</th>
<th>Statistical Test Used and p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;I believe observing whales and dolphins in the wild is less harmful to their populations then keeping them in captivity.&quot; (scale = 1-5)</td>
<td>No relationship seen.</td>
<td>Mann-Whitney U p=1.0</td>
</tr>
<tr>
<td>&quot;There is no point in doing what I can for the environment unless others do the same.&quot; (scale = 1-5)</td>
<td>No relationship seen.</td>
<td>Mann-Whitney U p=0.365</td>
</tr>
<tr>
<td>&quot;Zoos, aquariums, and animal parks inspire me to help conserve nature and wildlife.&quot; (scale = 1-5)</td>
<td>No relationship seen.</td>
<td>Mann-Whitney U p=0.741</td>
</tr>
<tr>
<td>&quot;It is too difficult for someone like me to help protect the oceans.&quot; (scale = 1-5)</td>
<td>No relationship seen.</td>
<td>Mann-Whitney U p=0.537</td>
</tr>
<tr>
<td>&quot;Whales and dolphins do not need to be protected.&quot; (scale = 1-5)</td>
<td>No relationship seen.</td>
<td>Mann-Whitney U p=0.333</td>
</tr>
<tr>
<td>&quot;Stranded marine mammals that cannot be returned to the wild should be euthanized (put down), rather than placed in marine mammal parks.&quot; (scale = 1-5)</td>
<td>Men more likely to agree. F=1.5 M=1.9</td>
<td>Mann-Whitney U p=0.031</td>
</tr>
<tr>
<td>Personal Efficacy Subscale Score (Scale = 1-10)</td>
<td>No relationship seen.</td>
<td>Mann-Whitney U p=0.821</td>
</tr>
</tbody>
</table>

**Nationality**—The findings of the Pre-Swim survey found significant associations between language/nationality and select attitudinal items, seen in table 5. The Post-Swim
survey found that language/nationality had no significant impacts the following attitudinal items following their Dolphins Plus experience.

<table>
<thead>
<tr>
<th>Survey Statement</th>
<th>Mean Score and General Relationship between Variables</th>
<th>Statistical Test Used and p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;My daily actions affect dolphins and the ocean.&quot; (scale = 1-5)</td>
<td>No relationship seen.</td>
<td>Mann Whitney U p=0.117</td>
</tr>
<tr>
<td>&quot;Zoos, aquariums, and animal parks inspire me to help conserve nature and wildlife.&quot; (scale = 1-5)</td>
<td>No relationship seen.</td>
<td>Mann Whitney U p=0.248</td>
</tr>
<tr>
<td>&quot;There is no point in doing what I can for the environment unless others do the same.&quot; (scale = 1-5)</td>
<td>No relationship seen.</td>
<td>Mann Whitney U p=0.164</td>
</tr>
<tr>
<td>&quot;Stranded marine mammals that cannot be returned to the wild should be euthanized (put down), rather than placed in marine mammal parks.&quot; (scale = 1-5)</td>
<td>No relationship seen.</td>
<td>Mann Whitney U p=0.819</td>
</tr>
</tbody>
</table>

**Personal Efficacy Subscale Score** (Scale = 1-10) | No relationship seen. | Mann Whitney U p=0.298 |

**Education**—The Pre-Swim survey determined that level of education significantly impacted some attitudinal items. (table 6) It was found that prior to coming to Dolphins Plus select preexisting conservation attitudes were impacted by education. It was found that increasing level of education correlated with more positive conservation attitudes. This relationship was not found in the Post-Swim survey results. The table below shows that the relationships between education and attitude seen in the Pre-Swim survey were not found to be significant in the Post-Swim survey.

<table>
<thead>
<tr>
<th>Survey Statement</th>
<th>Mean Score and General Relationship between Variables</th>
<th>Statistical Test Used and p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;My daily actions affect dolphins and the ocean.&quot; (scale = 1-5)</td>
<td>No relationship seen.</td>
<td>Kendall’s tau p=0.089</td>
</tr>
<tr>
<td>&quot;I would be willing to pay higher prices for common household products to protect the environment.&quot; (Scale=1-5)</td>
<td>No relationship seen.</td>
<td>Kendall’s tau p=0.467</td>
</tr>
</tbody>
</table>

**Personal Efficacy Subscale Score** (Scale = 1-10) | No relationship seen. | Anova p-value=0.066 |
**Prior Animal Park Experiences**— It was determined by the Pre-Swim survey findings that the Personal Efficacy Subscale Score was significantly impacted by frequency of past zoo visits. Frequent zoo visitors were found to have a lower Personal Efficacy Subscale Score prior to their program at Dolphins Plus. This association disappears following the visit to Dolphins Plus. No significant association was seen between past zoo visits and the Personal Efficacy Subscale Score according to the Post-Swim survey. Any reported changes in personal-efficacy seen from pre to post cannot be attributed to past zoo visits. (table 7)

<table>
<thead>
<tr>
<th>Survey Statement</th>
<th>Mean Score and General Relationship between Variables</th>
<th>Statistical Test Used and p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do past zoo visits affect the Personal Efficacy Subscale Score? (Scale=0-15)</td>
<td>No relationship seen.</td>
<td>Anova p=0.909 (F=.25)</td>
</tr>
</tbody>
</table>

**Level of Interest in Learning**— The reported level of interest in learning about marine life was found to significantly affect multiple attitudinal items in the Pre-Swim survey. It was determined that respondents who were highly interested in learning reported lower Personal Efficacy Subscale Scores and higher Conservation Subscale Scores in the Pre-Swim survey. Positive correlations were also seen in two individual attitudinal items on the Pre-Swim survey. Again, it was found that these associations were not seen to be significant in the Post-Swim survey. (table 8) Level of interest in learning had no impact on attitude on the Post-Swim survey.

**Summary**

This section analyzed the Post-Swim survey attitudinal responses for associations with intervening factors. All associations between intervening variable and attitudinal items that were seen in the Pre-Swim survey were analyzed again with the Post-Swim survey data. It was found that most significant associations with gender, nationality/language, education, past zoo visits, and level of interest in learning that were seen in the Pre-Swim survey were not seen in the Post-Swim survey. The only association that remained between intervening factors and attitude following the Dolphins Plus experience was related to Gender. Men were found to be more likely to agree that stranded, non-releasable marine mammals should be euthanized rather than placed in captivity. This significant association was seen in both the Pre-Swim survey and the Post-Swim survey. Generally, respondents’ conservation attitudes are not being influenced by outside factors following their visit. We can then attribute changes in conservation attitudes from before and after the Dolphins Plus visit to the actual experience and not to intervening factors. Programming at Dolphins Plus was found to increase certain
conservation attitudes related to animals in captivity and decrease conservation attitudes related to personal-efficacy and ability to positively impact the environment.

<table>
<thead>
<tr>
<th>Survey Statement</th>
<th>General Relationship between Variables</th>
<th>Statistical Test Used and p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Marine habitats are threatened everywhere in the world.&quot; (scale =1-5)</td>
<td>No correlation seen.</td>
<td>Spearman’s rho p=0.148</td>
</tr>
<tr>
<td>&quot;I would be willing to pay higher prices for common household products to protect the environment.&quot; (scale = 1-5)</td>
<td>No correlation seen.</td>
<td>Spearman’s rho p=0.518</td>
</tr>
<tr>
<td>&quot;There is no point in doing what I can for the environment unless others do the same.&quot; (scale = 1-5)</td>
<td>No correlation seen.</td>
<td>Spearman’s rho p=0.715</td>
</tr>
<tr>
<td>&quot;It is too difficult for someone like me to protect the oceans.&quot; (scale = 1-5)</td>
<td>No correlation seen.</td>
<td>Spearman’s rho p=0.941</td>
</tr>
<tr>
<td>Personal Efficacy Subscale Score (Scale=1-10)</td>
<td>No correlation seen.</td>
<td>Spearman’s rho p=0.954</td>
</tr>
<tr>
<td>Conservation Subscale Score (Scale=1-15)</td>
<td>No correlation seen.</td>
<td>Spearman’s rho p=0.452</td>
</tr>
</tbody>
</table>

4. Knowledge

This section will describe and compare results of the knowledge section from the Pre-Swim survey and the Post-Swim survey. This analysis will breakdown each question and analyze trends in correct and unsure responses before and after the visit to Dolphins Plus. The cumulative Quiz Score and Unsure Score will also be compared from the pre to post surveys to evaluate any overall, significant changes in knowledge. This analysis will show which questions were difficult for respondents, which saw the greatest disparities in responses from pre to post, and what knowledge, if any, was gained after visiting Dolphins Plus.

Changes from Pre-Swim to Post-Swim

Ten quiz questions were present in both the pre and post surveys. Questions that were present in one survey and not the other were left out of this analysis. These ten questions are analyzed in table 9 below. Out of the 10 questions, 6 questions saw an increase in percentage of correct answers in the Post-Swim survey. Of the remaining questions, 3 had the same average correct score in the pre and post. Only 1 question saw
a slight decrease in the average correct score in the Post-Swim survey. These results show that respondents generally scored higher on the knowledge section of the survey following their visit. The percentages of unsure responses to each knowledge item were also analyzed. 7 of 10 knowledge items saw a decrease in the average percentage of unsure responses. The remaining 3 questions saw neither an increase or decrease in uncertainty and had identical average unsure scores. Not only did respondents choose more correct answers in the post they also were potentially more confident in their answers. I would infer that these results show that the Dolphins Plus experience did have a positive impact on visitor knowledge. Miller et al., (2013), found similar results regarding increased visitor knowledge following a swim-with-dolphins experience. Their study found a short-term increase in knowledge of participants of dolphin shows and a long-term increase in knowledge of participants of interactive programs. Miller, concluded that the program type, length, and entertainment value of the program can impact knowledge retention. I would recommend looking into this finding further in the future study to see if program type significantly influenced knowledge gained and retained.

Table 10 below depicts the overall average Quiz Scores and Unsure Scores for both surveys. These scores were compared from pre to post to summate the findings seen in table 9 and determine significance. We saw an increase in correct responses to the majority of individual knowledge items, but determining an overall, cumulative change in scores will add another layer of insight to a potential increase in knowledge. The average Quiz Score increased 9% from pre to post. This increase was found to be statistically significant. The Unsure Score also saw a very slight increase in the Post-Swim survey even though the majority of individual questions saw a decrease in unsure responses. It was determined that this minor difference in average Unsure Scores between the pre and post surveys was not significant.

Summary

This section analyzed changes in knowledge from the Pre-Swim survey to the Post-Swim survey. The average quiz score increased 9% following programming at Dolphins Plus. This overall increase in knowledge is an important finding of this pilot study. One of the main research questions this study hoped to answer was if visitors to Dolphins Plus are in fact learning and gaining marine conservation related knowledge during their visit. These findings demonstrate a significant increase in marine conservation related knowledge from the pre to post. This finding provides statistical backing to the claim that Dolphins Plus provides exceptional educational experiences for visitors. One focus of the future study will be to determine if knowledge gained is retained long-term. A 3-6 month follow up survey will add much insight to the lasting impacts of participating in programming at Dolphins Plus.
<table>
<thead>
<tr>
<th>Quiz Question</th>
<th>Pre-Swim Average Correct Score</th>
<th>Post-Swim Average Correct Score</th>
<th>% Change in Average Correct Score</th>
<th>Pre-Swim Average Unsure Score</th>
<th>Post-Swim Average Unsure Score</th>
<th>% Change in Average Unsure Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1. Which of the following is the top threat to dolphins worldwide?</td>
<td>89%</td>
<td>89%</td>
<td>0%</td>
<td>11%</td>
<td>11%</td>
<td>0%</td>
</tr>
<tr>
<td>Q2. Dolphin and whale strandings are primarily caused by sonar activities?</td>
<td>30%</td>
<td>32%</td>
<td>2%</td>
<td>62%</td>
<td>62%</td>
<td>0%</td>
</tr>
<tr>
<td>Q3. Bottlenose dolphins are a threatened or endangered species?</td>
<td>14%</td>
<td>14%</td>
<td>0%</td>
<td>49%</td>
<td>32%</td>
<td>-17%</td>
</tr>
<tr>
<td>Q4. Humans and dolphins rely on some of the same resources.</td>
<td>81%</td>
<td>97%</td>
<td>16%</td>
<td>16%</td>
<td>3%</td>
<td>-13%</td>
</tr>
<tr>
<td>Q5. Humans that live away from the coast can affect the waters where dolphins live.</td>
<td>89%</td>
<td>100%</td>
<td>11%</td>
<td>8%</td>
<td>0%</td>
<td>-8%</td>
</tr>
<tr>
<td>Q6. Which of the following are leading causes of dolphin and whale deaths worldwide?</td>
<td>8%</td>
<td>16%</td>
<td>8%</td>
<td>19%</td>
<td>11%</td>
<td>-8%</td>
</tr>
<tr>
<td>Q7. Since manatees need a source of freshwater to survive, giving manatees water from a hose keeps them healthy and safe.</td>
<td>41%</td>
<td>57%</td>
<td>16%</td>
<td>49%</td>
<td>30%</td>
<td>-19%</td>
</tr>
<tr>
<td>Q8. Which percentage of the world's population relies on fish as a primary source of protein?</td>
<td>3%</td>
<td>3%</td>
<td>0%</td>
<td>46%</td>
<td>32%</td>
<td>-14%</td>
</tr>
<tr>
<td>Q9. Worldwide, millions of jobs rely on healthy and abundant ocean resources.</td>
<td>87%</td>
<td>84%</td>
<td>-3%</td>
<td>14%</td>
<td>14%</td>
<td>0%</td>
</tr>
<tr>
<td>Q10. In general, bottlenose dolphins in captivity live as long as those in the wild.</td>
<td>19%</td>
<td>51%</td>
<td>32%</td>
<td>46%</td>
<td>30%</td>
<td>-16%</td>
</tr>
</tbody>
</table>
### Table 5.10. Comparison of Average Quiz and Unsure Scores from Pre-Swim to Post-Swim

<table>
<thead>
<tr>
<th></th>
<th>Pre-Swim</th>
<th>Post-Swim</th>
<th>Change in Score</th>
<th>Statistical Test Used</th>
<th>Significant? Yes or No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Quiz Score</td>
<td>51%</td>
<td>60%</td>
<td>9%</td>
<td>Paired T-Test p=0.003</td>
<td>Yes</td>
</tr>
<tr>
<td>Average Unsure Score</td>
<td>33%</td>
<td>34%</td>
<td>1%</td>
<td>Paired T-Test p=0.852</td>
<td>No</td>
</tr>
</tbody>
</table>

**Associations with Intervening Variables**

It was found in the Pre-Swim survey that age, education, and language/nationality had statistically significant effects on knowledge. Age and language were found to impact the Unsure Score. Level of education was found to affect the Quiz Score. These bivariate relationships were again analyzed in the Post-Swim survey to determine if the same associations were present following programming at Dolphins Plus.

**Age**—Age was found to significantly impact the Quiz Score and Unsure Score in the Pre-Swim survey. The 25-34 age group reported the highest Quiz Scores and the lowest Unsure Scores. This group, with more years of life experience and higher levels of education, was more confident in their responses to knowledge items on the Pre-Swim survey. This association between age and certainty of knowledge responses was not seen in the Post-Swim findings. There was no significant relationship between age and Unsure Scores following the Dolphins Plus visit. (table 11)

**Level of Interest in Learning**—The Pre-Swim survey determined that the level of interest in learning about marine life had a significant impact on the Quiz Score. Respondents who were highly interested in learning scored higher on the knowledge items. This association was not found to be significant on the Post-Swim survey. (table 11)

**Summary**

This section analyzed potential associations between intervening factors and knowledge reported on the Post-Swim survey. The Post-Swim survey data was used to analyze significant associations that were seen in the Pre-Swim survey. The Pre-Swim findings included associations between age and level of interest in learning and the Quiz Score. The Pre-Swim survey also found a significant relationship between age and the Unsure Score. These potential bivariate relationships were analyzed in the Post-Swim survey as well in order to compare results. It was found that no associations that were present in the Pre-Swim survey were found in the Post-Swim survey. It can be determined that changes in knowledge, including changes in both the Quiz Score and Unsure Score, are attributed to the Dolphins Plus experience. The gain in knowledge seen from pre to post program can be attributed to programming at Dolphins Plus rather than to age or level of interest in learning.
Table 5.11. Post-Swim Associations between Intervening Variables and Knowledge Responses

<table>
<thead>
<tr>
<th>Quiz Scores</th>
<th>General Associations between variables</th>
<th>Statistical Test Used and p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does age affect the Quiz Score?</td>
<td>No relationship seen.</td>
<td>Anova p=0.084 (F=2.27)</td>
</tr>
<tr>
<td>Does level of interest in learning affect the Quiz Score?</td>
<td>No relationship seen.</td>
<td>Anova p=0.074 (F=1.64)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unsure Scores</th>
<th>General Associations between variables</th>
<th>Statistical Test Used and p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does age affect the Unsure Score?</td>
<td>No relationship seen.</td>
<td>Anova p=0.715 (F=.53)</td>
</tr>
</tbody>
</table>

5. Impacts of Swim Participation

The Post-Swim survey sample included a higher proportion of program observers (35%) and a smaller proportion of swim participants (62%). This group of observers will likely have a different Dolphins Plus experience than swim participants. Swim participants are likely to form a stronger connection to the animals. Studies have shown that a feeling of connectedness to nature can impact one’s likelihood to actively protect nature. (Erdogan, 2015) It was found that swim participants, on average, scored 10% higher than observers. This difference of means was found to be statistically significant using a one-way Anova. An F-test was used. (table 12) Swim participation does impact the Dolphins Plus experience. Swim participants are leaving Dolphins Plus with a greater knowledge gain than that of observers.
Comparison of Findings to Miller et al., 2013

This project was influenced by Miller et al. 2013. Multiple survey items were taken directly from the 2013 study. Figure 4 shows the survey items that were utilized from Miller et al. 2013. Miller’s study showed an overall short-term increase in attitude. The current study did not show an overall increase in environmental attitudes but did show an increase in one attitudinal item. The Personal Efficacy Subscale Score was calculated by combining the following items from Miller et al. 2013, “It is too difficult for someone like me to help protect the oceans,” and “There is no point in doing what I can for the oceans unless others do the same.” These items both saw more positive outcomes in Miller’s post survey but did not in the current study.

Two of the attitude items used in both this survey and Miller’s survey were analyzed individually. The following statement, “This experience increased my caring for dolphins and the ocean,” was analyzed to determine what proportion of visitors agreed with the statement. Miller et al. found that 95% of respondents who participated in an interactive dolphin program agreed with the statement. The current study also determined that 95% of respondents agreed. The second attitudinal item, “This was one of the best experiences of my life,” was also analyzed. Miller et al. found that 88% of interactive participants agreed with the statement. The current study also found that 89% of respondents agreed with the statement. The attitudinal findings of Miller’s study have held true for the current project. Interactive programming with dolphins can positively impact visitors and inspire them to care for the ocean and marine life.

Miller et al. 2013 also found an increase in short term knowledge. The current study depicted similar findings regarding short term gains in knowledge. The Miller study saw a mean knowledge score increase from 4.28 to 4.52 among interactive participants. The current study saw a 9% increase in knowledge scores from the Pre-

<table>
<thead>
<tr>
<th>Participation Type</th>
<th>Average Quiz Score</th>
<th>Average Unsure Score</th>
<th>Average Conservation Subscale Score</th>
<th>Average Personal Efficacy Subscale Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant</td>
<td>64%</td>
<td>30%</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Observer</td>
<td>54%</td>
<td>38%</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>Test Used and p-value</td>
<td>Anova p=0.026 (F=4.08)</td>
<td>Anova p=0.202 (F=1.68)</td>
<td>Anova p=0.37 (F=1.02)</td>
<td>Anova p=0.076 (F=2.79)</td>
</tr>
</tbody>
</table>

6. Comparison of Findings to Miller et al., 2013
Swim to Post-Swim surveys. It was found that both studies exhibited similar findings. This study not only added insight to Miller’s study but also demonstrated that interactive dolphin programs of different types and at different venues can have similar positive impacts regarding conservation knowledge and attitudes.

<table>
<thead>
<tr>
<th>Figure 5.1. Survey Items Used from Miller et al., 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attitude Items</strong></td>
</tr>
<tr>
<td>Dolphins do not need to be protected from humans</td>
</tr>
<tr>
<td>Humans have the right to modify the oceans to suit their needs</td>
</tr>
<tr>
<td>I would be willing to pay much higher prices for common household items to protect the oceans</td>
</tr>
<tr>
<td>Dolphins are just another animal</td>
</tr>
<tr>
<td>It is too difficult for someone like me to help protect the oceans</td>
</tr>
<tr>
<td>When humans interfere with the ocean it often has disastrous consequences</td>
</tr>
<tr>
<td>There is no point in doing what I can for the oceans unless others do the same</td>
</tr>
<tr>
<td><strong>Additional Attitude Items used in Post-Swim Survey</strong></td>
</tr>
<tr>
<td>This experience increased my interest in learning more about dolphins and the ocean</td>
</tr>
<tr>
<td>This was one of the best experiences of my life</td>
</tr>
<tr>
<td><strong>Knowledge Items</strong></td>
</tr>
<tr>
<td>Humans and dolphins depend on some of the same resources</td>
</tr>
<tr>
<td>People that live away from the coast can affect the waters where dolphins live</td>
</tr>
<tr>
<td>Marine debris in the ocean is not a serious problem</td>
</tr>
</tbody>
</table>

7. Conclusion

This chapter provided an analysis of the changes in attitude and knowledge seen from the Pre-Swim survey to the Post-Swim survey. Many significant findings were made, leading to the overall conclusion that visitors are affected by their experience at Dolphins Plus. This study aimed to determine how the Dolphins Plus experience impacts visitor knowledge, attitude, and behavior. This chapter analyzed changes seen regarding respondent’s attitudes and knowledge. It was found that some conservation attitudes did change and that these changes from the Pre-Swim to the Post-Swim survey were significant. We can infer that the Dolphins Plus experience is having some sort of positive impact on visitor’s attitudes regarding the environment, the purpose of captive animals in conservation efforts, and their personal impact on our planet. These impacts were found to be both positive and negative. Select conservation attitudinal items saw an increase in the Post-Swim survey. Most attitudinal items that saw an increase were
related to visitor opinion of captive animals and the role of zoological institutions in aiding conservation. It was also found that after leaving Dolphins Plus visitors are less confident in their ability to positively impact the environment. This finding will be addressed further in the recommendations section.

It was also found that visitors are leaving Dolphins Plus with increased marine conservation knowledge. Visitors generally scored higher on knowledge items following their visit. This 9% increase in knowledge scores was determined to be significant by a paired t-test. Visitor experience not only lead to an attitudinal shift but an increase in knowledge. These factors play a major role in determining human environmental behavior.

Potential associations between intervening factors and attitudinal and knowledge items were also described. All statistically significant relationships seen between socio-demographic factors and past experiences in the Pre-Swim survey were evaluated again in the Post-Swim survey. It was found that most relationships seen in the Pre-Swim findings were found to be not statistically significant in the Post-Swim survey. This finding leads us to believe that visitors are being impacted by their experience at Dolphins Plus. Intervening factors, with the exception of one attitudinal item, did not interfere in the Dolphins Plus experience and changes to knowledge or attitudes following the visit.

It was also found that the type of participation has a significant impact on knowledge. The Post-Swim survey sample reported a higher proportion of observers than the Pre-Swim survey. This observer group is leaving Dolphins Plus with an overall lower level of conservation knowledge. Swim participation does positively impact knowledge gain.

This chapter also included a comparison of our findings to the findings of Miller et al. 2013. Many similarities were found among the findings of both studies. The current study, like Miller’s project showed some increases in attitude, although Miller’s study showed positive impacts on conservation attitudes. Miller’s findings also included an overall increase in knowledge, as did the current study. These similarities strengthen the argument that zoos, aquariums, and similar institutions can positively impact visitor conservation knowledge.

At the root of behavior change is altering attitude, which stems from beliefs and values. Altering beliefs and values is not a simple shift and requires an input of new information or new experiences. If zoo and aquarium educational experiences can impact people in a way that creates an emotional response while increasing knowledge and awareness these institutions may be able to positively impact conservation. Miller et al., (2013) suggests that interactive programs, such as swimming with dolphins, can be a productive and successful method for inspiring visitors to get involved in conservation efforts.
A goal for the future, proposed study will include an analysis of behavior change following a visit to Dolphins Plus. This analysis will provide a more complete understanding of the potential impacts of programming and Dolphins Plus and similar zoological institutions. The literature suggests that changes in attitude and knowledge can lead to changes in behavior. This pilot study has shown that changes in attitude and knowledge were seen and were significant. The future study will determine if these changes will lead to changes in pro-conservation behavior. An analysis of behavioral impacts will allow zoos, aquariums, and similar institutions to accurately understand the visitor experience. A complete understanding of the visitor experience will provide insight to how successfully these institutions are fulfilling missions of education and conservation.
Chapter 6 - Conclusion

1. Introduction

This final chapter will provide a descriptive summary of the study. The summary will include a re-statement of the study purpose, goals, and a brief review of the past literature. The focus of this chapter will be a summarization of the study findings and the implications on the current body of knowledge. This chapter will also describe limitations to the study and will conclude with recommendations for the future study to be conducted by Dolphins Plus.

2. Summary of Study Purpose

The current body of literature regarding the impacts of programming at zoos, aquariums, and similar institutions is limited and not fully understood. Modern day zoos and aquariums regularly claim missions of education and conservation but generally don’t have data to back up these claims. Analyzing zoo and aquarium conservation education impacts is a relatively new field and requires further investigation. Studies, such as this one, can be used to evaluate these claims and shed light on zoological institutions. The findings of this study can aid in improving educational programs at Dolphins Plus, and similar venues, to best benefit conservation of wildlife, habitats and the environment.

This study will act as a pilot study for Dolphins Plus to implement a larger scale study in the future. The future study will be implemented and completed by Dolphins Plus researchers. My contribution will serve as a starting point for the future study. This pilot study has provided initial insight to the effectiveness of programming at Dolphins Plus. Recommendations will be made later in this chapter to improve the future study.

3. Methodology

This pilot study used a repeated-measures, internet-based survey design. Two separate but similar surveys were designed. The Pre-Swim survey was sent electronically to upcoming visitors to Dolphins Plus to gauge demographic information and preexisting knowledge, attitudes, and behaviors. The Post-Swim survey was sent electronically to past visitors of Dolphins Plus who participated in the Pre-Swim survey. The goal of the Post-Swim survey was to analyze the Dolphins Plus experience and determine potential changes in knowledge and attitude following their visit. Many challenges and limitations were found with the methodology used that will be addressed later in this chapter. Due to this study functioning as a pilot, many methodological challenges were worked out
during this stage of the project to be able to streamline and improve implementation of the future study to be conducted by Dolphins Plus in the near future.

4. Summary of Findings

The Pre-Swim survey determined the types of people who visit Dolphins Plus, their socio-demographic background, and past experiences. The findings from the Pre-Swim survey gave us insight to visitor’s preexisting knowledge, attitudes and behaviors and what existing factors influenced knowledge, attitudes, and behaviors.

The Pre-Swim survey determined that the majority of respondents to be female, 45-54 years old, a native English speaker, with a college degree. Most respondents were frequent zoo visitors and had not previously swam with dolphins. It was also determined that the majority of respondents were themselves program participants.

Some socio-demographic factors and past experiences were found to impact the knowledge, attitudes, and behaviors of the respondents. These relationships were investigated in order to determine to what extent the Dolphins Plus experience is impacting visitor knowledge, attitudes, and behaviors rather than intervening factors. It was found that gender, language, education, frequency of prior zoo visits, and level of interest in learning about marine life all play a role in influencing respondent’s preexisting attitudes regarding conservation. Women, native English speakers, highly educated respondents, frequent zoo visitors, and highly interested respondents were all found to have more positive attitudes towards conservation.

The Pre-Swim survey also found that gender, language, education, past zoo visits, and level of interest in learning about marine life influenced preexisting environmental behaviors. The same factors that impacted preexisting attitudes in respondents also were found to impact preexisting behaviors. Women, native English speakers, highly educated respondents, frequent zoo visitors, and highly interested respondents participated in a higher number of activities relating to wildlife, nature, conservation or the environment. These same demographic groups reported more positive conservation attitudes. Environmental attitudes have been documented to influence environmental behavior. (Erdogan, 2015) Impacting and altering the conservation attitudes of visitors through their experience, could be one method for impacting behavior. The Pre-Swim survey demonstrated that the same types of respondents that exhibit positive conservation behaviors tend to partake in more pro-environmental behaviors.

The Pre-Swim survey also analyzed existing knowledge. Most respondents answered correctly 50-60% of the time and were unsure 30-40% of the time. It was determined that age and level of interest in learning about marine life were the only intervening factors that affected preexisting knowledge. The 25-34 age group scored highest on knowledge items and was most confident in their responses to the knowledge items. This may potentially due to high level of education among this age group. The
future proposed study should further investigate this group to determine what is influencing their higher levels of marine conservation knowledge.

The findings from the Post-Swim survey provided additional insight into the types of people who visit Dolphins Plus. It was found that the respondent subset who answered both surveys consisted of a very similar demographic breakdown as the full Pre-Swim survey population. Again, the majority of respondents were female, between 45 and 54 years old, and native English Speakers. The majority were highly educated with at least a college degree. Most respondents had visited a zoo or aquarium 2-3 times during the past two years and had not swam with dolphins before. Very similar levels of interest in learning about marine life were also reported for both the pre and post surveys. The only noticeable difference in the Post-Swim demographics from the Pre-Swim was a higher proportion of respondents with a graduate degree. This change in the demographic makeup of the study sample may have impacted the increase in knowledge seen from the pre to the post survey. Pre-Swim results showed that higher levels of education can impact attitudes regarding conservation. This finding was not found to the same degree in the Post-Swim survey.

The focus of the Post-Swim survey was to assess changes in knowledge and attitude from the pre to the post. It was found that some conservation attitudes changed and that these changes from the Pre-Swim to the Post-Swim survey were statistically significant. We can infer that the Dolphins Plus experience is having some impact on visitor conservation attitudes although these changes would benefit from further study. The majority of attitudinal items did not see significant change from pre to post. One important change found in respondent attitude was the change in the Personal Efficacy Score. The Post-Swim findings showed that visitors reported lower levels of personal efficacy towards the environment after their visit. This could be an important finding for predicting behavior. This finding will need to be analyzed in the future study. Respondents generally showed more “positive” attitudes regarding marine mammals in captivity following their visit. The Dolphins Plus experience was shown to cause visitors to be more comfortable with the concept of captive animals and their role in conservation. Respondents also generally scored higher on knowledge items following their visit. A 9% increase in knowledge was found from the Pre-Swim survey to the Post-Swim survey. It was also found that swim participants scored higher than observers on knowledge items. Swim participation vs passive observation was shown to be a more valuable experience, in terms of knowledge gained. Dolphins Plus can confidently claim that their programming is positively impacting visitor knowledge regarding marine life and conservation.

Knowledge and attitude play a major role in determining human environmental behavior. The future study will add insight and determine if visitor’s experience at Dolphins Plus has any significant effect on environmental and conservation behaviors. Miller et al., (2013) suggests that aquarium interactive programs, such as swimming with
dolphins, can impact visitors in a way that inspires a shift in knowledge, attitude, and behavior.

As previously mentioned, change in behavior will be analyzed in the future study to provide a more complete understanding of the potential impacts of programming and Dolphins Plus and similar zoological institutions. The literature suggests that impacting attitude and knowledge can lead to changes in environmental behavior. This pilot study has shown that changes in attitude and knowledge were seen and were significant from the Pre-Swim survey to the Post-Swim survey. Determination of behavioral impacts will allow zoos, aquariums, and similar institutions to understand how their programming is impacting their visitors. A solid understanding of the visitor experience will provide insight to how successfully these institutions are fulfilling missions of education and conservation.

5. Limitations and Delimitations

Limitations

The biggest limitation at the forefront of this project is the inherit uncertainty of relying on the public for voluntary cooperation. This study is completely reliant on the visitors of Dolphins Plus being willing to complete online surveys. Some visitors will likely opt out of taking the surveys and some may not complete the surveys in their entirety. There are many factors at play that can influence a visitor’s decision to take a survey. It is probable that some surveys will be incomplete. Survey fatigue is a genuine concern and we will design the surveys in a way to limit this issue. The main limiting factor is that the survey results are entirely out of our control after they are sent to visitors. We are relying on visitors to voluntarily take the three surveys. We are also relying on visitors to complete the surveys in their entirety and as honestly as possible. We will work with these limitations and do our best to mitigate potential issues whenever possible by designing brief, user friendly surveys.

Nonresponse bias is another limitation of this project. Our respondents are limited to people who choose to visit Dolphins Plus. Many factors come into play when determining who visits Dolphins Plus and who does not. The location of Dolphins Plus will impact those who visit. Key Largo is a tourist destination and therefore many visitors to Dolphins Plus are tourists, many from European countries. Economic factors also play a part. Participating in programming at Dolphins Plus can be a relatively expensive experience that may not be affordable to certain sectors of the population. There is also the issue of people’s attitudes and beliefs regarding animals in captivity. There are certain sectors of the population who would decide not to visit Dolphins Plus on the principal that they do not agree with keeping animals or specifically marine mammals in captivity. Many factors play a role in determining who decides to visit Dolphins Plus. Those who cannot or choose not to come will be automatically left out of the study sample.
A main limitation of this study is the fluid nature of how visitors arrive to Dolphins Plus. The majority of visitors make program reservations online. Visitors can make online reservations for the following day or for the following year. Visitors also often walk in and make a same-day program reservation. This “rolling system” causes the limitation to how surveys are administered and to whom. Visitors making reservations for the same day are left out of the study sample due to inadequate time to send and receive a pre-swim survey response prior to participating in a program. The decided upon methodology for administering the pre-swim surveys involved sending out the survey email invitation the same day, up to two or three days after the date the visitor made the reservation. This means that some visitors are receiving the pre-swim survey the day before their program date and other visitors are receiving the pre-swim survey months ahead of their program date. This is due to the nature of the reservation system and the decided implementation protocol. This issue will be addressed later in the recommendations.

Differences between the Pre-Swim and Post-Swim survey design also causes some limitations for data analysis. Slight differences with question wording, differing response options, and the removal/additions of questions from the Pre-Swim survey to the Post-Swim survey were found. Differences in items included on both surveys creates limitations for a successful repeated measures survey project.

Pilot studies can be very useful in preparing for a major study, but they do have their limitations. While conducting a pilot study it is possible for researchers to make inaccurate assumptions regarding how the future study will play out. It is also true that although pilot studies can be beneficial, some potential issues will remain unseen during the pilot study. There is also the issue of data contamination when conducting a pilot study. Data contamination can occur when data from the pilot study is included in the results of the main study. Contamination can also occur when respondents from the pilot study are included in the main study. Methodologies or research tools used in the pilot study may be flawed, leading to inaccurate data. These limitations should be considered, and potential issues mitigated when conducting a sound pilot study. (Teijlingen and Hundley, 2001)

Delimitations

There were factors involved in this study that were not tested for that could have had a potential impact on the way respondents answered the surveys. For example, factors including environmental conditions were not recorded for this study. The date of the program and type of program were recorded but the weather conditions for the day of the program were not recorded. It is possible that weather conditions could have potentially influenced the overall experience for the visitor. Another factor not recorded or tested for was the behavior of the dolphins themselves during the duration of the program. Like weather conditions, it is possible that the behavior of the dolphins interacting with the visitors could play a role in visitor experience and enjoyment.
6. Study Implications

This pilot study evaluated the type of visitor that attends Dolphin Plus, what prior knowledge, attitudes, and behaviors they bring to their visit, and the implications of their visit on conservation knowledge and attitudes. This study showed that visitors are being impacted and influenced by their experience at Dolphins Plus. The findings show that changes in attitude were limited and would benefit from further study conducted by Dolphin Plus. It was determined that significant changes in knowledge were seen. The Dolphins Plus visitor experience did inspire knowledge gain. This finding not only adds credibility and validity to Dolphins Plus as an institution of informal education. This finding also adds insight to a limited body of knowledge evaluating the educational impacts of zoos, aquariums, and swim-with-dolphins programs. This pilot study will be used to guide and inform a future study to be conducted by Dolphins Plus. Findings from the pilot study and the future study will be able to be compared to determine if similar impacts were seen. This study can also serve to guide, inform, and inspire other aquariums, zoos, and swim-with-dolphins venues to conduct survey research to evaluate their visitor experience.

7. Recommendations

Challenges and limitations were discovered throughout the pilot study process. Issues with the survey design caused unforeseen challenges during the data analysis process. As previously mentioned, the knowledge and attitude sections of the pre and post surveys varied slightly. There were issues discovered with differing question wording, differing response options, and the removal/additions of questions from the Pre-Swim survey to the Post-Swim survey. I recommend that the knowledge, attitude, and behavior items provided in the Pre-Swim survey be replicated identically in the Post-Swim survey and Follow-up survey. This will allow for easier and more thorough comparison of results from each of the three surveys. Removing questions from the Pre-Swim survey in the post surveys omits that survey item from pre-post analysis and defeats the purpose of a repeated-measures design. Additional questions can be added to the Post-Swim and Follow-up surveys to further gauge visitor attitudes regarding their visit as they were in the pilot study. These additional questions add insight to the evaluation of impacts of the Dolphins Plus experience.

The Pre-Swim survey methods and implementation included many limitations and challenges, as previously discussed. In order to improve this study, many recommendations should be made. As mentioned previously, lack of automation in Pre-Swim survey invitations and reminder prompts led to many challenges and limited consistency in survey invitation timing. I recommend that the all three surveys, Pre-Swim, Post-Swim, and Follow-Up be fully automated using Survey Monkey. All survey invitations and reminder prompts should be scheduled for a future date and sent automatically on that date. In order for this to be possible, all invitations for a particular
date should be placed in its own collector in Survey Monkey. Survey invitations for many different program dates were placed in the same collector on Survey Monkey during the pilot study Pre-Swim implementation. This created challenges with timing and consistency. A more thorough knowledge and understanding of the Survey Monkey program will greatly improve this study.

Another issue with survey invitation timing came from inconsistency when retrieving email addresses from new booking on the Dolphins Plus online reservation system. There was no set methodology in regard to timing of email retrieval. I recommend that email addresses should be compiled from the booking system twice per week, on the same days each week, ex: every Tuesday and Friday. This will add consistency and streamline the survey invitation process.

Implementation of the Pre-Swim survey invitation process involved manually entering email addresses into the Survey Monkey system. This was done out of lack of knowledge with the Survey Monkey platform. I recommend that emails addresses, and other demographic information, should be added to Survey Monkey by uploading a CSV contact sheet. This was done during implementation of the Post-Swim survey and greatly reduced time spent sending survey invitations. The CSV contact sheet should include: email address, unique ID, last name, booking date, program date, program type, location, and zip code. This CSV sheet should be updated and uploaded to Survey Monkey twice per week, on the same days selected to retrieve email addresses from the online reservation system. By doing so the Survey Monkey contact list will be regularly updated to include new reservations. In Survey Monkey contact groups can be created to simplify and organize the contact list. I recommend that contact groups be created for set date ranges. For example, if emails are retrieved from the reservation system on Tuesday and Friday, the two contact groups for that week should be labeled with the appropriate booking date ranges.

Automation of reminder prompts was a challenge faced when implementing the Pre-Swim survey due to lack of understanding of the automation features of Survey Monkey. To mitigate this issue reminders should be scheduled for 1 week after each invitation date. Organizing each date into its own collector, as recommended previously, will allow simply automation of reminder prompts. Cut off dates should also be assigned for each collector in Survey Monkey. Assigning a cutoff date closes that particular collector and doesn’t allow for any further surveys to be completed. An appropriate cut off time frame will need to be discussed and decided upon by Dolphins Plus during the future study.

During the pilot study implementation, survey data was exported from Survey Monkey multiple times. This was found to be not necessary and quite time consuming. Survey response data should be exported from Survey Monkey by Dolphins Plus researchers immediately following the closing date for each of the three surveys. Data should be exported and saved at the end of the Pre-Swim survey period, again at the end
of the Post-Swim survey period, and one last time at the end of the Follow-up survey period. This will save time and allow for simpler data management.

One final recommendation for Dolphins Plus researchers would be to ensure that the timing of the Post-Swim survey and Follow-up surveys allow for pre-post analysis of behaviors. Pre-post behavior change was not analyzed or described in this pilot study. It was decided by myself and my graduate committee that there was not sufficient time between the Dolphins Plus visit and the Post-Swim survey invitation to truly see behavioral changes in visitors. The Post-Swim survey was sent to visitors 3 weeks following their visit. This was determined by my committee to be too short a time span for visitors to alter their environmental behaviors. As mentioned previously, many visitors to Dolphins Plus are international visitors. Generally, these visitors are coming from European countries to vacation with their families in Florida. It is likely that three weeks following their visit to Dolphins Plus these European visitors may either still be traveling or just returning to their home country. These visitors are not likely to begin new environmental behaviors during this travel time. Gauging true behavior change would be much more effective after allowing visitors sufficient time to return home, reflect upon their experience at Dolphins Plus, and then decide if they wish to alter their behaviors. I recommend allowing at more time between the visit and the implementation of the Post-Swim survey in order to effectively gauge behavior change in visitors.

The majority of implementation challenges that were found during the Pre-Swim survey process were address during Post-Swim survey implementation. This project was a learning experience for myself and for Dolphins Plus. Many limitations and challenges were discovered throughout survey implementation. It is my hope that my contribution in the form of this pilot study inform, guide, and allow Dolphins Plus to improve the future, planned study.
References


Appendix. Full Text of Surveys

Full Text of Pre-Swim Survey

1. Do you agree to participate in this survey?
   -Agree
   -Disagree

2. Are you a swim participant or observer?
   -Participant
   -Observer
   -Neither

3. How old are you?
   -18-25
   -25-34
   -35-44
   -45-54
   -55-64
   -65 or older

4. What is your gender?
   -Male
   -Female

5. What is your primary language?
   -English
   -Other (please specify)

6. What is the highest level of education you have completed?
   -Grade school
   -Some high school (Secondary school)
   -High school graduate
   -Technical school, associate’s degree, or other post-secondary diploma
   -College graduate (University)
   -Some graduate school
   -Graduate degree (Master’s, Law, Medicine, PhD, etc.)

7. Are you a member of any environmental or conservation organization(s)?
   -No
   -Yes. Please provide the name of at least one.

8. Who is visiting Dolphins Plus? Please check all that apply.
   -Myself
9. What is the purpose of this visit to Dolphins Plus? Please check all that apply?
- Celebrate a special event
- Curiosity/experience something new
- Entertainment
- Further knowledge of dolphins and marine life
- Love of animals
- Recommended by a friend or family member
- Spend time with friends or family
- Other (please specify)

10. During the past two years, about how many times have you visited a zoo, aquarium, or animal park?
- None
- Once
- 2-3 times
- 4-6 times
- More than 6 times

11. Have you ever participated in a swim with dolphins program before?
- No
- Yes. Please specify: in the wild or captivity, where, and the approximate year.

12. Using the slider below, please show how interested you are in learning about marine life and oceans. [scale = 0 to 100]
Very disinterested----------------------------------------------------------Very interested

13. How do you most commonly learn about wildlife and nature? Please check no more than two.
- Facebook, Twitter, or Instagram
- Internet websites
- Magazines
- My children or grandchildren
- Nature parks or wildlife refuges
- Classes at school
- Talks or presentations by experts
- TV, movies, or videos
- Zoos, aquariums, or animal parks
- Other (please specify)
14. Below is a list of activities commonly supported by zoos, aquariums, and animal parks. Which two of these are most important to you?
- Animal rescue and rehabilitation
- Education
- Entertainment
- Research
- Wildlife and habitat conservation

15. Which of the following statements best describes your personal recycling practices at home?
- I recycle all eligible waste supported by programs where I live.
- I recycle all eligible waste when access to receptacles is convenient.
- I occasionally recycle.
- I never recycle.

16. Please rate to the extent to which you agree or disagree with the following statements.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree somewhat</th>
<th>Neutral</th>
<th>Agree somewhat</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>
- Water conservation is an important issue in my community.
- Marine habitats are threatened everywhere in the world.
- I consider energy efficiency when buying new electrical products.
- My daily actions affect dolphins and the ocean.
- I would be willing to pay higher prices for common household products to protect the environment.
- Interacting with marine mammals in the wild has little impact on those animals.
- There is no point in doing what I can for the environment unless others do the same.
- Zoos, aquariums, and animal parks inspire me to help conserve nature and wildlife.
- It is too difficult for someone like me to help protect the oceans.

17. In the past two years, what activities have you pursued in efforts to uphold your commitment/connection to nature, wildlife, conservation, and/or the environment? Check all that apply.
- Attended educational events/seminars
- Contacted government officials
- Donated money to organizations
- Educated friends, family, or children
- Helped with a community, park, or beach clean-up
- Joined a rally or protest
- Made sustainable seafood choices at a grocery or restaurant
- Reduced fertilizer or pesticide use in my yard
- Volunteered for an organization or event
- Visited a national park
- Recycled
- Pursued a higher level of education in the field of conservation
- Planted a home garden, trees, or other efforts to restore my home to a natural state
- Shared stories I connect with on Facebook/Instagram and other social media platforms
- Volunteered at a local non-profit with a conservation mission
- Other (please specify)

18. Which of the following is the top threat to dolphins worldwide?
- Humans
- Sharks
- Hurricanes
- Unsure

19. Dolphin and whale strandings are primarily caused by sonar activities.
- True
- False
- Unsure

20. Bottlenose dolphins are a threatened or endangered species.
- True
- False
- Unsure

21. Humans and dolphins rely on some of the same resources
- True
- False
- Unsure

22. Humans that live away from the coast can affect the waters where dolphins live.
- True
- False
- Unsure

23. The Marine Mammal Protection Act does all of the following except?
- Makes it illegal to touch wild dolphins
- Allows people to approach wild dolphins at a safe speed
- Penalizes people who feed wild dolphins and manatees
- Makes it illegal to harass wild dolphins
- Unsure

24. Which of the following are leading causes of dolphin and whale deaths worldwide?
   Please check the top two causes.
- Boat strikes
- Global warming
- Pollution/trash/discarded fishing gear
- Hunting/taking illegally
- Military sonar activities
- Unsure
25. Since manatees need a source of freshwater to survive, giving manatees water from a hose keeps them healthy and safe.
-True
-False
-Unsure

26. Which percentage of the world’s population relies on fish as a primary source of protein?
-less than 5%
-15%
-50%
-75%
-Unsure

27. Worldwide, millions of jobs rely on healthy and abundant ocean resources.
-True
-False
-Unsure

28. In general, bottlenose dolphins in captivity live as long as those in the wild.
-True
-False
-Unsure

29. Please rate the extent to which you agree or disagree with the following statements.
Strongly disagree  Disagree somewhat  Neutral  Agree somewhat
Strongly agree

-It is better for an animal to be born into captivity than taken from the wild.
-It is important to allow native peoples, such as the Alaskan Inuits, to hunt whales for food and to support their culture.
-The ocean is so large, it will take many generations before damage from humans is obvious.

30. Please rate the extent to which you agree or disagree with the following statements.
Strongly disagree  Disagree somewhat  Neutral  Agree somewhat
Strongly agree

-I believe observing whales and dolphins in the wild is less harmful to their populations than keeping them in captivity.
-People who visit zoos and aquariums acquire knowledge about animals and conservation while being entertained.
-Whales and dolphins do not need to be protected.
-Stranded marine mammals that cannot be returned to the wild should be euthanized (put down), rather than placed in marine mammal parks.
**Full Text of Post-Swim Survey**

1. Do you agree to participate in this survey?
   - Agree
   - Disagree

2. Please select the benefits you acquired as a Dolphins Plus visitor. Please check only two.
   - Entertainment
   - Further my knowledge and understanding of marine mammals
   - General curiosity
   - Life celebration
   - Love of animals
   - Quality family time

3. Since your visit to Dolphins Plus have you become a member of any environmental or conservation organization(s)?
   - No
   - Yes. “please specify the name of one.”

4. Using the slider below, please show how interested you are in learning about marine life and oceans.
   Very disinterested---------------------------------------------Very interested

5. Please rate to the extent to which you agree or disagree with the following statements.

   Strongly disagree  Disagree somewhat  Neutral  Agree somewhat  Strongly agree
   - Water conservation is an important issue in my community.
   - Marine habitats are threatened everywhere in the world.
   - I consider energy efficiency when buying new electrical products.
   - My daily actions affect dolphins and the ocean.
   - I would be willing to pay much higher prices for common household products to protect the environment.
   - Interacting with marine mammals in the wild has little impact on those animals.
   - There is no point in doing what I can for the environment unless others do the same.
   - Zoos, aquariums, and animal parks inspire me to help conserve nature and wildlife.
   - It is too difficult for someone like me to help protect the oceans.

6. Below is a list of activities commonly supported by zoos, aquariums, and animal parks. Which two of these are most important to you?
   - Animal rescue and rehabilitation
- Education
- Entertainment
- Research
- Wildlife and habitat conservation

7. Please rate to the extent to which you agree or disagree with the following statements.

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</tr>
</thead>
</table>

- Since my visit to Dolphins Plus I am more environmentally conscious.
- There are things I can do to help dolphins.
- My experience at Dolphins Plus increased my caring for dolphins and the ocean.
- My Dolphins Plus visit was one of the best experiences of my life.
- Animal display facilities like Dolphins Plus give the public the ability to learn more about species.

8. Which of the following is the top threat to dolphins worldwide?
- Humans
- Sharks
- Hurricanes
- Unsure

9. Dolphin and whale strandings are primarily caused by sonar activities.
- True
- False
- Unsure

10. Bottlenose dolphins are a threatened or endangered species.
- True
- False
- Unsure

11. Marine debris in the ocean is not a serious problem.
- True
- False
- Unsure

12. Humans and dolphins rely on some of the same resources
- True
- False
- Unsure

13. Humans that live away from the coast can affect the waters where dolphins live.
- True
- False
- Unsure
14. The Marine Mammal Protection Act does all of the following except?
- Makes it illegal to touch wild dolphins
- Penalizes people who feed wild dolphins and manatees
- Encourages people to feed wild dolphins
- Makes it illegal to harass wild dolphins
- Unsure

15. Which of the following are leading causes of dolphin and whale deaths worldwide?
Please check the top two causes.
- Boat strikes
- Global warming
- Pollution
- Hunting/taking illegally
- Unsure

16. Giving manatees water from a hose keeps them healthy and safe.
- True
- False
- Unsure

17. Which percentage of the world’s population relies on fish as a primary source of protein?
- less than 5%
- 15%
- 50%
- 75%
- Unsure

18. Worldwide, millions of jobs rely on healthy and abundant ocean resources.
- True
- False
- Unsure

19. In general, bottlenose dolphins in captivity live as long as those in the wild.
- True
- False
- Unsure

20. Please rate to the extent to which you agree or disagree with the following statements.

Strongly disagree  Disagree somewhat  Neutral  Agree somewhat  Strongly agree

- It is better for an animal to be born in captivity than taken from the wild.
It is important to allow native peoples like the Inuit the right to hunt whales and dolphins on a small scale for food and to support their culture.

Humans have the right to modify the oceans to suit their needs.

21. Please rate to the extent to which you agree or disagree with the following statements.

Strongly disagree    Disagree somewhat    Neutral    Agree somewhat    Strongly agree

-I believe observing whales and dolphin in the wild is less harmful to their populations than keeping them in captivity.
-When humans interfere with the oceans it often has disastrous consequences.
-Whales and dolphins do not need to be protected from humans.
-Stranded marine mammals that cannot be returned to the wild should be euthanized (put down), rather than placed in marine mammal parks.