The Use of Video in Zoo Exhibits to Convey Conservation Messages to Adult Visitors.

Thesis

Presented in Partial Fulfillment of the Requirements for the Degree of Master of Science
in the Graduate School of The Ohio State University

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The Ohio State University

2009

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ABSTRACT

Relaying conservation messages to visitors is an ongoing effort on the part of most zoos and aquariums around the country. Methods of conveying messages vary from institution to institution based on what is thought might be most meaningful to the visitor. The goal of this research was to explore aspects of attention by visitors to conservation messaging specifically in videos shown in zoo exhibits. This was accomplished by conducting two studies. The first phase, a study entitled "Factors that Influence the Viewing of Video Containing Conservation Messages in Zoo Exhibits by Visitors", isolated and then examined 13 factors from previous research that were thought to contribute to the success of exhibits in zoos and other informal learning institutions therefore enhancing the likelihood that visitors internalized intended messages. Once identified, visitors were asked to rank the factors in order of importance and preference based on what would influence their decision to stop and watch a video containing conservation messages in an exhibit. The second phase, "Visitor Connection with Conservation Messages from Video in Zoo Exhibits in Relation to their Personal Values" began with the premise from previous research that an individual’s personal values may relate to their connectedness with nature (Schultz and Zelezny, 2003). For the purposes of this study, visitors were asked to complete a value-oriented questionnaire related to zoos, animals, animals in captivity and conservation messaging as part of an exhibit.
DEDICATION

This is dedicated to my mom, Leonie S. Bennett, who only ever wanted three things in life for me - well Mom, now I can check off #1....
ACKNOWLEDGEMENTS

The last three years have been an experience of challenges, which would have, in many cases, been very hard to overcome if it hadn't been for the encouragement, attention, support and patience of many people.

First, I'd like to thank my advisor, Dr. Joe Heimlich for his knowledge and guidance through times of uncertainty. I learned many things about myself through my interactions and many friendly altercations with him - each which had a purpose that sometimes took me some time to figure out and understand.

I would also like to thank members of my committee - both current and former. Dr. Rick Voithofer - thank you for sticking with this project throughout - it was and still is much appreciated. Dr. Jeremy Bruskotter - thanks so much for filling in at the last minute when needed - your help has been immeasurable. Finally, Dr. Randy Heiligmann - your emails of encouragement and support as well as patience will not be forgotten.

On a more personal note, my thanks goes out to the members of my family - to my dad, Court Bennett - who always expressed his support through undenyng humor and sarcasm (yes, it's true - I am finally finished). To my sister, Tanya who made me realize that anything is possible at any age and if I really want it, just work through the hard times
and do it. To my brother-in-law whose quiet support was always there, recognized and appreciated. And, to my 2 nieces, Lucy and Emma, whose infinite smiles and innocent but sensitive look on life made this whole thing bearable - thanks girls.

Of course, many friends were involved in this endeavor as well - far too many to mention here - you all know who you are and I thank you from the bottom of my heart. Special thanks to Barb Revard who not only guided me with her friendship, and support, but also made interaction with the Columbus Zoo incredibly easy.

Finally, to the members of the Heimlich Cohort (past and present) - Emily, Victor and Nichole - I wish you much luck as you finish up your endeavors; Elaine - thanks for everything. Special thanks however, goes to Dr. Preethi Mony who has been a great friend throughout, but a solid rock of support especially over these last few weeks - you will never know how much your words of encouragement and many phone calls helped with the final success of this project - I can't thank you enough.
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Fields of Study

Major Field: Natural Resources
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CHAPTER I

INTRODUCTION

As technology continues to be an important method of education, many informal or free-choice learning institutions, such as zoos and aquariums, are expanding their methods of conveying important messages regarding conservation of species and habitat to the public – to appeal to the values of their visitors and ultimately inspire action. Many of these methods include digital technology, interactive computer programs and video kiosks. The question is whether incorporating these technologies into existing or new exhibits are actually fulfilling the expectations of the institutions and their visitors - are they drawing and keeping the attention of the visitor and is the visitor internalizing these messages.

This research focuses on attention to conservation messaging in zoo exhibits and what influences visitors to make the decision to stop and watch a video containing that content. This is accomplished by approaching the task from two different perspectives – the practical application that focuses on design factors already established as contributing to successful exhibit design, and value-based inquiry of adult visitors which lends insight into what value zoo visitors place on topics relating to conservation. The goal is to incorporate both fields of thought and draw conclusions from the results. Because two phases are involved, Figure 1.1 below illustrates the organization of the research. The
The first phase identified thirteen factors from the literature that contributed to the success of exhibits in zoos and aquariums. A questionnaire was designed to investigate importance levels and choices visitors made regarding these factors when making the decision to stop and watch a video in an exhibit. Each factor had two parts associated with it - one that asked the visitor to rank how likely the presence of that factor would influence them to stop to watch the video, and a second that asked them to choose their preferences regarding specific details of that factor.

**Figure 1.1: Organization of research**

The second phase examined the connection between visitor personal values and topics regarding conservation. Often based on an association with the innate human need for a connection to the natural world, past studies have shown both positive and negative correlations between an individual’s value system and the response he or she will have
regarding environmental issues. Based on this premise, the instrument in this study consisted of four different statements - each focusing on a different topic surrounding conservation. The statements were designed to reveal the degree that visitors value zoos and conservation, animals and conservation issues, animals in captivity and conservation of species, and video in exhibits as a way to convey conservation messages.

Although the second phase is not a direct continuation of the first, it was designed as a result of the inconclusive data that analysis of the first study produced. These data revealed that the zoo visitors who participated in the survey had no overall preference for the way conservation messages are presented in order for them to make the decision to stop and watch a video with that content. The second phase was developed to determine whether personal values with respect to zoos and animals in general had an effect on the value visitors place on the way they learn about conservation - whether watching videos in zoo exhibits actually had any sort of effect on them at all.

**Need for the Study**

In its broadest sense, this research explores what influences visitor attention specifically regarding conservation messaging present in video located in zoo exhibits. This reveals the first gap in the research. Much of the research found concerning visitors, design elements and zoo exhibits fell under two general categories - those which discussed very general, practical ideas developed to aid design firms and planning departments as to what to consider when developing exhibits (Jenkins, 1985; Patterson & Bitgood, 1987, 1988; Miles, 1990; Bitgood, 1994; Madsen & Madsen, 1997) and, on the opposite end of
the spectrum, those that were very tightly focused on a single exhibit or idea without much expansion (Bitgood, Benefield, Patterson & Litwak, 1990; Schnackenberg, 1997; Sparacino, Larsen, MacNeil, Davenport, & Pentland, 1999). There was only one study found that focused on a single component of an exhibit and its effect that it may have on the visitor individually. Bitgood (1999) reported on the impact factors regarding the setting of an exhibit. He referred to fifteen individual factors that have been studied by himself or others and associated them with the overall principle of setting. While each perspective is valuable in its own right, there was a gap in addressing video use from both the practical point of view as well as the theoretical. Further, are there potential conclusions of the theoretical and the practical that can guide those wanting to better communicate conservation messages?

The search for research on the success of videos turned up very little which unveils another gap in the existing research. There is a great deal of practical and evaluative research on successful exhibit design that discusses everything from criteria for building successful exhibits (Bitgood, 1994; Madsen & Madsen, 1997) to assessing the role particular species of animals play in exhibit development (Fraser, Bicknell & Sickler, 2006). Focusing part of this research on the importance visitors place on the presence of video in an exhibit would begin to build connections between the existing research on general exhibit design with the incorporation of video.

Until recently, much of the value-based studys explored broad environmental topics and best methods of measuring public attitudes and behavior (Stern, Dietz, Abel, Guagnano
These studies have, in some cases, raised questions regarding inconclusive results, which has established a need for modification of development of method (Schultz, Shriver, Tabanico, Khazian, 2003; Schultz & Zelzny, 2003; Fraser, Gruber & Condon, 2008).

Recently, zoos have developed their exhibits to incorporate a focus on conservation of species and habitat (Swanagan, 2000). With that, discussion on effective means of passing these messages on to their visitors in order to raise awareness and action has surfaced. This study will add to that pool of research with the intent to connect personal values with the values individuals place on video containing conservation messages in zoo exhibits.

**Research Questions**

The over-arching question for this research is “What influences visitor attention to conservation messages from videos in zoo exhibits?” Each component study however, has its own set of sub-questions that have a more specific focus.

**Phase 1:**

- Does video support conservation messaging in institutions such as zoos & aquariums?
- What design factors from the literature are used in exhibit development and design?
• What design factors are considered of importance to the zoo visitor when making the decision to stop and watch a video?
• Do visitors have strong preferences regarding choices surrounding exhibit design principles?

Phase 2
• Do specific personal values of zoo visitors influence the viewing of conservation messages in videos present in zoo exhibits?
• Is there a connection between values regarding zoos and animals to those regarding conservation issues?
• Is there a correlation between scores given to statements regarding zoos in the community, animals in nature and animals in captivity vs. the scores given to that which focuses on learning about conservation issues through video in a zoo exhibit?

Limitations/Assumptions
• All the instruments designed for this study were given to zoo visitors during or at the end of their visit. The zoo setting itself could influence the responses of the participants.
• The length of the instrument for the first study (a total of 3 pages) may have influenced the integrity of the responses.
• Although adult visitors were targeted, many were in the presence of children or other group members, which could have caused them to hurry through their responses.

• Some of the design factors incorporated into the first survey were initially identified as general exhibit design factors - not specifically pertaining to video as an exhibit component. The assumption connected to this limitation is that these factors can seamlessly apply to video in an exhibit as well.

• One of the premises for which Phase 1 was based on the assumption made by Johnston (1998) in which he reported that longer viewing times indicated greater interest and provided a longer window during which visitor education may occur. Serrell (1990) initially made a similar claim but then readdressed it in 1996 stating that, after a three-year period of intensive visitor observation and interviews, it cannot be considered valid standing on its own - that it must take other aspects of exhibit design into consideration.

• Certain factors will contribute more to viewing than others.

• Enhancing the visitor experience through the isolation of those significant factors will lead to increased probability that learning will occur.

• When discussing the role personal values play in issues of the environment, conservation concerns are synonymous with environmental concerns.
Definition of Terms

Attitude

• A person's evaluative judgement about a particular entity typically expressed in degrees of favorability (Eagley & Chaiken, 1993).

• A predisposition to act in a positive or negative way toward some object (Littlejohn, 2002).

Environmental Attitudes

• The collection of beliefs, affect and behavioral intention a person holds regarding environmentally related activities or issues (Schultz, 2008).

Environmental Values

• Those values that are specifically related to nature or that have been found to correlate with specific environmental attitudes or concerns (Schultz, 2004).

Factors

• For the case of this research, "factors" is interchangeable with effective design principles.

Values

• Conceptualized as important life goals and principles (Rokeach, 1973; Olsen & Zanna, 1993).

• Standards which serve as guiding principles in a person's life (Schwartz, 1992).
CHAPTER 2
A REVIEW OF THE LITERATURE

The organization of this literature review flows with the order of the two studies as they were conducted. The literature selected for each of the studies was based upon the research questions designed for each study as well as challenges, assumptions and questions that came up as the research progressed.

FACTORS IN DESIGN FOR VIDEO IN ZOO EXHIBITS

Emergence of Study of Visitors
The first literature regarding effects of development of museums on their visitors began as early as the 1930s by A. Melton (1933) and E.S. Robinson (1928) with discussion on architecture. This created the groundwork for what is currently labeled as the field of visitor studies in informal learning institutions that is known today. After this initial push, the interest in the field went dormant until the late 60s/early 70s (Patterson, 1989). Specific research on various topics that use the concepts behind visitor studies took off at that time, addressing the role of the visitor in the development of exhibits. In 1968, Shettell published research regarding the quality of museum science exhibits and from there, the interest appeared to be renewed. From this point on, the field expanded and as
of 1973, the first experimental studies were conducted in a public museum (Patterson, 1989) focusing on the exhibits already labeled "successful".

In the 1980s, a variety of leaders in the fields of visitor studies, environmental psychology and exhibit design began to develop and initiate a number of studies regarding the principles of successful exhibit design based on documented visitor observation. Individual topics such as motion in exhibits (Martin & Reilly, 1982), sensory factors in exhibits (Peart, 1984; Koran, Koran, & Longino, 1986) and visitor participation and interaction with the components of exhibits (Screven, 1986) all surfaced with strong evidence that as a result of observing and tracking visitors, research contributed to the idea of successful exhibits.

As more studies were conducted, more questions concerning effective exhibit design surfaced - namely, the question of learning through relaying appropriate messages through exhibits. When this question began to take form, it created an entirely new direction for exhibit design and development. Researchers were able to take what was previously learned concerning design principles and look at it from the perspective of communicating messages to the public so the educational goals of these "informal learning" institutions were met. At a national conference of zoos and aquariums in 1985, D. Jenkins even went to the extent to "warn against using exhibits that do not educate". Since many of these institutions include education as important part of their mission statement or at least their strategic goals, the connection between exhibits and educating
visitors has become one of the most prevalent and important topics in the field of visitor studies to date.

**Exhibits in Zoos**

Zoos are an important and complex example of institutions that create experiences addressing a multitude of goals - those that promote conservation, educate the public and provide a complete family experience as well as a valuable source of entertainment (Fraser, et al, 2008). Most zoos accredited by The Association of Zoos and Aquariums (AZA) have now incorporated into their missions, some facet of "to conserve wildlife and natural habitats through changing the attitudes of its visitors" (Norton, et al, 1995). The goals that zoos often require of themselves are frequently accomplished through educational programs and visitor interaction with staff when available. More often than not however, it is not practical to assume that every visitor will be able to attend an educational program or have the chance to have any sort of interaction with a staff member. It is also not practical to assume that educational programs and staff interaction are the best way to pass on educational messages for all visitors. Research on learning in institutions such as zoos and aquariums has revealed that educational outcomes are as much engineered by the visitor on his or her own as with attending an educational program (Clayton et al, 2008). Zoos are also faced with the additional challenge of creating exhibits that can stand on their own in accomplishing the aforementioned goals. This requires determining the most complete means of measuring visitor learning in exhibits and, once identified, implement the means successfully.
Besides questions that were raised regarding how and if visitors are able to learn from exhibits (which is beyond the parameters of this review), there is relevant discussion in the literature regarding exhibit design principles that appear to encourage the opportunity for visitors to learn. Based on early research that clustered visitors into categories or styles of approaching and moving through an exhibit based on the time spent within said exhibit, an assumption emerged that the longer the time a visitor spent in an exhibit, the more information and knowledge one could absorbed (Serrell, 1996). This accelerated inquiry into the specific design principles that encouraged attraction and attention to exhibit components, which had been studied in communications for decades prior (Miles, & Alt, 1988). In subsequent studies by Serrell (1998) however, the notion of styles was abandoned and she went on to outline challenges encountered over three years of projects exploring visitor observation, time and tracking and interviews while working under this premise. She ultimately came to a more complex conclusion that still incorporates the original assumption made regarding time spent, but makes clear that it cannot stand on its own in order to be valid.

One of the more critical questions that should be addressed in the development of an exhibit is that of the exhibit's ability to communicate - does the experience make sense and is it set up so that visitors can self-select meaning. Several other bodies of research agree with this statement in one form or another. For example, Bitgood, et al (1990) identifies "presenting the material (in exhibits) in an understandable manner" as a potential challenge for designers as they develop an exhibit - is the text too intensive, does it make sense and is there too much of it are common questions that often arise.
Another important point that Serrell (1996) concluded was that exhibits, the components they are comprised of, and the application of proper design principles need to be looked at as a means to an end - each component of an exhibit should be addressed individually; each design principal needs to be researched and applied based on concrete knowledge (not assumption) and all need to be viewed as integral parts of the planning and development process as a whole.

**Exhibit Design Principles and Visitor Learning**

One of the most notable articles that first mentioned the use of exhibit design principles and the effects they may have on visitors was described as setting "the agenda for exhibit design and educational programming up to today (Hanson, 2002). It was written in 1968 by William Conway, a former director of the New York Zoological Society, titled "How to Exhibit a Bullfrog: A Bed-time Story for Zoo Men". It is, ironically, an imaginary account of a bullfrog in a natural exhibit using graphics, audio, brochures, signs and labels, as well as film to educate zoo visitors in the areas of natural history, evolution and conservation. There are many similarities between this tale of a devil named "M" guiding the author through a bullfrog exhibit and eloquently pointing out what causes an exhibit to success or fail and the principals of exhibit design found in a continuum of research since then.

The research on exhibit design principles is vast. Studies come from diverse fields such as design, communications, leisure studies, and museum studies, and institutions including art museums, science museums, zoos, natural history museums and more.
They range from simple lists to intensive research projects involving an array of professionals from different fields and institutions. Some are strictly by the book - providing a guide to designers as to what appears to succeed and how to go about accomplishing them. In one study, the authors provide more than sixteen principles (also called factors) and descriptions of the research found as they have been studied (Patterson & Bitgood, 1988). Another study investigates the principles that apply specifically to "setting" - that of size and naturalism of exhibit, proximity of animal to viewing area, etc - and how they might impact the visitor (Bitgood, 1999). Madsen & Madsen (1997) developed a tool to aid in exhibit planning that "attempts to bring the designers in touch with the museum professional's knowledge and requirements to develop a profile on which design decision can be made" (p 12). This study referenced a total of twelve principles split between those of content and those of appearance. Ironically, in this paper there was no mention of the role of the visitor.

Other bodies of research approach the principals from a more theoretical or conceptual point of view - discussing learning, attitudes, emotions and more, in reference to exhibit design principals. In an article that discusses affective learning and experiences, Roberts (1992) points out that the way visitors interpret what they see in an informal learning environment such as a zoo or museum, goes way beyond labels and signs - the affective modes inherent in visitors pick up subtle messages that may have nothing to do with what is portrayed on a graphic. Conservation attitudes and behavior is the subject of a study, where factors that appear to influence attitudes are investigated through a series of surveys, petitions and solicitation cards (Swanagan, 2000). Throughout the variety of
approaches to exhibit design, trends did emerge with reference to individual factors repeatedly coming forward as contributing to successful exhibits. It is important to note at this stage, that the terms "success" and "effective" in reference to exhibits were defined in many different ways throughout this literature search. One study appeared to gauge an exhibit as successful by the type of animal it housed and how expensive it was to develop it (Swanagan, 2000). Another claimed that the "educational power" of an exhibit depends on the form of visual communication used to convey intended messages (Schnackenberg, 1997). Fraser, Bicknell & Sickler (2006) stated that zoo developers strive to "create experiences that resonate with visitors and promote an increased sense of concern for wildlife and wild place conservation." (p 1). Even with this variety of definitions, individual design factors that were assumed to contribute to successful exhibit design were found to be fairly consistent.

**Video in Zoo Exhibits**

Literature regarding design factors as applied to the planning, development and design of a video component in any exhibit-driven institution is extremely limited. Another challenge adding to this search is the timeliness of the information in the research found - most studies are at least 20-30 years old, and, as is well known, there have been massive technological advances in exhibit design during the time since. Much of the more recent literature found focused on the development and use of specific products designed to enhance visitor experiences within exhibits. For example, Sparacino (1999) discusses the use of wearable computers to aid in enhancing the opportunity for the visitor to "experience" the story or the messages being conveyed by an institution. Although video
is still used in exhibits, one can't help but wonder what the future for this medium will be and how it might be utilized as technology advances even more.

Miles (1989), from The Natural History Museum in London, England reported on evaluations that were carried out on the use of "audiovisuals" (AV) in three different exhibits at the museum in the 70s and 80s by Alt (1979), Griggs (1983) and Jarrett (1987). Miles defined these AV's as the use of slide-tape or videotape within exhibits which otherwise consisted of static graphics. In order to complete these evaluations, possible design variables isolated based on "experience" at The Natural History Museum. This was the only article found that actually described factors as related to video as a specific component of exhibit design. These seven factors were found, in some cases, to overlap and expand upon those that applied to general exhibit design and were used in combination with them as follows.

**Design Factors**

Most factors recognized from the literature fell into broader categories such as design, visitor generated and architectural (physical features) (Patterson & Bitgood, 1988). Similar to that of "successful" and "effective", these categories were established but not concretely defined.
GENERAL DESIGN FACTORS

1) Exhibit size

Research regarding exhibit size generally agrees that larger animals or larger exhibits resulted in longer viewing times and were described as "most liked and memorable" (Bitgood, et al, 1986; Patterson & Bitgood, 1988).

2) Aesthetic factors

These factors have been defined as the shape, color, pattern and/or texture that visitors are exposed to in an exhibit setting (Melton, 1972; Martin & O'Reilly, 1982). It was noted that even though there is not much reported evidence for the impact these factors have on visitors, they warranted further observation to their importance as it is suspected that they can impact the visitor.

3) Novelty/rarity

Patterson & Bitgood, (1988) introduced the idea of exhibits automatically attracting visitors without much effort if they contain rare objects - or in this case rare animals. In a separate body of research whose purpose was to assess the meaning of different animals to its visitors using word-pairs, a Grevy's Zebra and African Wild Dog were both noted as having sample sizes of more than double in number than more common animals such as dolphins or sharks (Fraser, et al, 2006). It is however, understood that other situations could have contributed to this difference, but the gap is distinct enough to lend credence to the observation that both these animals are not as often seen in zoos as the others.
4) Interactive features

The presence of interactive features seems to be a debatable issue. The questions surrounding this topic are those of money and worth. Jenkins (1985) stated that if the visitor cannot "push it, feel it, ring it or smell it, it is just not state-of-the-art" (p 12). More recent research on the use of technology in museums point out that some institutions have successfully moved their visitors from the static role of passive viewer to that of a participant with the introduction of interactive devices which, in turn, has shown to enhance their experience (Sparacino, Larson, MacNeil, Davenport, Pentland, 1999). Klein (1986, in Sparacino, Larson, MacNeil, Davenport, Pentland, 1999, p.1) points out that many traditional methods of relaying information and building a storyline for their visitors - like signs, labels and graphics - can actually interrupt the visitor's absorption into the exhibit and shifts their attention from "observing and contemplating to reading and understanding". He also points out that information on signs is often limited because of space physical space and display surface availability. This is a challenge that can often be avoided and solved with the presence of an interactive element. As stated in the beginning of this section however, it is often the cost of state-of-the-art interactive units that provide a challenge for many institutions.

VISITOR FACTORS

5) Comfort level

The comfort level of an exhibit can refer to a number of different qualities including control of temperature and adverse weather conditions, negative odors and others (Patterson & Bitgood, 1988). Johnston (1998) pointed out that especially in zoos where
many exhibits (or much of individual exhibitions) are outdoors comfort could play a major part in the apparent success of an exhibit. Presence of seating can also be included as another factor that has been assumed to be a reasonable indicator of success. The noted assumption there is a place to sit should correlate with increased viewing time - although there are no concrete studies to verify this claim (Bitgood, 1999). In 1979, a study by Alt did reveal that visitors did stay longer at a video presentation is there were seats present, but could not come to any definitive conclusion regarding cause and effect. Did the visitors sit because of the video or did they watch the video because of the presence of seats? Evidence regarding this question was raised by Jarrett (1987) who reported that visitors attending a video concerning Sea Cows only stayed if they found that seats available.

6) Crowd levels

There have been a number of studies reporting the effect that crowds have on the way visitors interact with an exhibit - both positive and negative. In some cases, a higher crowd level around an exhibit will actually draw in more visitors based on the assumption that something interesting must be going on in the vicinity. In other cases, however, crowd level has just the opposite effect under the assumption that the large crowd will result in longer wait time to experience the exhibit (Patterson & Bitgood, 1988).
ARCHITECTURAL OR PHYSICAL FACTORS

1) Location

When the notion of design factors as applied to exhibits began emerge, Melton (1935) recognized the fact that visitors stop less frequently as they near the end of an exhibit and labeled this the "exit gradient effect". Miles (1989) reinforced this claim by stating that any sort of audio/visual (AV) component placed at the beginning of an exhibit was more likely to attract visitors than one near the end. Anecdotal evidence from evaluation studies, however, refute this claim but do not provide broad transferability (CMA, 2007). A related issue to location of an AV component in an exhibit is that of specific placement within an exhibit - should it be out in the open, in it's own area, etc. - was proposed by Peart & Kool in 1988 yet, to date, no conclusive research has been conducted.

2) Automation

The research that has addressed the question of what attracts and holds the attention of visitors - a video presentation that is self started versus one that runs continuously versus on a timed schedule - can be considered quite complex. A number of studies completed between 1970 and 1990 resulted in two general conclusions:

- visitors arriving at the beginning of a program stayed for much longer than those arriving after it had started (Alt, 1979; Jarrett, 1987)
- visitors arriving after the start did not attempt to watch or wait for it to begin again - they moved on to the next exhibit (Griggs, 1983)
3) Setting

Discussion of location as a factor introduced the question of the internal layout of an exhibit in relation to its components. Individual displays, windows, props, signs, interpretive objects, etc. are all components identified that could attract visitors and impact the way they move about the exhibit (Bitgood, Benefield, Patterson, & Litwak, 1990). Literature that addressed choices concerning placement of AV programs/components is limited. The main questions that surfaced are should they be housed only in theater-style venues or could videos be placed in open areas as kiosks or televisions (Miles, 1990)?

4) Length of program/presentation

The general consensus in the literature is that there is little time available to capture and relay a message to visitors. In a study done in the Reptile Section of the Arizona Trail at The Phoenix Zoo, visitors were observed to spend anywhere between 10 seconds and 10 minutes touring the exhibit with an average of 2.94 minutes (Schnackenberg, 1997). Bitgood (1999) surmised that if visitors have to search for an animal in an exhibit, they spend even less time viewing. In one of the only studies found that referenced a video-oriented program, Alt (1979) noted that about 50% of the subjects that entered at the beginning of his 13 minute program left within 35 seconds. In contrast to this study, however, Miles (1990) noted that certain programs at The Natural History Museum in London that are of a longer duration do hold the interest of the audience for the duration. The conclusion drawn was there are variables particular to each program that need to be measured along side the length of the program to gauge its' success.
5) Audio

The presence of an audio component is an important consideration in the development of any interactive or technological component of an exhibit. The most that appears to have been researched in this area is which type of audio is most accessed by visitors and least annoying to onlookers and those around the source trying to enjoy other components of the same exhibit. Choices in the research are limited to presence of speakers (dependent and independent of the unit) vs. handsets or headphones (Miles, 1989).

NOT CATEGORIZED

1) Exhibit/landscape immersion

The earliest form of exhibit immersion was in 1896 in the First Annual Report of the New York Zoological Society and was described as areas "in which living creatures can be kept…in spaces so extensive that with many species, the sense of confinement is either lost or greatly diminished, yet, at the same time, sufficiently limited that all the animals are nor inaccessible or invisible to the visitor (Hanson, 2001, p 26). This idea is still used in the planning of today's zoos. Originally created by zoo designer Grant Jones of architecture firm Jones & Jones, the modern term "landscape immersion" in which exhibits should be designed around the natural environment of the animals, but observation areas should be incorporated within them so the visitor is "immersed" into the animal's domain and experiences the exhibit from the inside out (Ahern, Leduc & York, 2006). Bitgood (1990) reports on a body of research that showed a strong correlation between exhibit immersion and comments such as "a feeling of time and
"place" and "excitement" which suggests that feeling immersed in an exhibit is exciting and creates an affective impact on the visitors.

2) Messaging and clarity of message

Presence of message and establishing its purpose quickly, clearly and effectively are important in the development of video within zoo exhibits because previous research has shown that the probability of a visitor leaving the exhibit is greatest within the first minute (Alt, 1979). As a result, Alt also points out that the visitor may or may not be able to ever truly "capture" the intended message completely because they view the presentation with the consistent underlying purpose of leaving the exhibit. Another observation from the literature that has been made regarding the content of the message itself is that it is often assumed by designers that visitors will be interested in the same issues they are or at the same level of intensity (Bitgood, 1991) which is not an accurate assumption to make in most cases. If a designer includes and/or emphasizes content based on what he/she considers important, visitors may lose interest and the intended message may be ignored or lost.

VALUES AND VIDEO FOR CONSERVATION MESSAGING

The relationship between values as a measurement of individual attitudes and actions regarding environmental issues is a complex one. In this literature review, discussion of E.O. Wilson's (1984) biophilia hypothesis and Schultz's (2002) connectedness with nature concept will be discussed, providing both a basic outline of each as well as the
role values play in each. Values and its counterparts will be then be discussed. This will lead into possible explanation of how the aspects of the biophilia, connectedness with nature and values can be drawn together to play a role in determining how personal values contribute to the success of relaying conservation messaging through video. Figure 2.1 below illustrates this theorized connection. By ascertaining the level of value zoo visitors place on specific issues and concerns surrounding conservation of species and correlating it to the value they place on a method of learning about those issues.

**Figure 2.1: Proposed connection of concept to goal of Phase 2**

**The Human Connection to the Natural World**

In 1984, E.O. Wilson put forth the notion of biophilia as the "innate tendency to focus on life and life-like processes" (Kellert, 1993, p 20) or the inherent human need for a connection with living things. Describing biophilia as an "innate tendency" equates to a
hereditary (genetic) need or a vital part of human nature that cannot be altered (Wilson, 1993). Although philosophical in nature, it does become biological and psychological in explanation. Kellert (1993) directly associates nine "presumably biologically-based" (p 43) human values with the biophilia hypothesis to offer explanation as to the human need for valuing and connecting with the natural world. Table 2.1 lists these nine value categories, a brief explanation of each and the function of each as a general value. Upon further reflection, it was observed that the functions Kellert associated with these nine values are, in many ways, very similar to the motivations that account for values described in the Schwartz Value Theory (SVT), which is based on what he terms "the universal requirements of human existence" (Schwartz in Bardi & Schwartz, 2003, p 1208). See Table 2.2 for the ten values associated with this theory, brief descriptions and their functions. The similarity between the values associated with Wilson's biophilia concept and the SVT lends further support to the connection between general personal values and determining individual levels of environmental concerns.

Schultz's (2002) concept of connectedness with nature reinforces the idea that humans have a need to be connected to the natural world, (as is the idea behind Wilson's biophilia hypothesis) but adds the individuals' ability to assess their own beliefs of the extent to which s/he is part of the natural world. This concept establishes a basis for the assumption that the degree to which an individual feels connected to the natural world is directly connected to their personal values. There have been numerous attempts to measure this connection. The Inclusion of Nature in Self (INS) scale developed by Schultz (2002) is probably the most straightforward in that it consists of a series of
progressively overlapping circles labeled as "self" and "nature". Participants are then instructed to indicate which "picture" best represents the way they see their relationship with nature. The results of using this scale could be interpreted by using an earlier tripartite value system of egoistic, altruistic and biospheric, put forth by Stern, Dietz & Kalof, (1993) which categorizes individuals in their level of environmental concern based on where they think they fall within the INS scale. These three categories are often described as:

<table>
<thead>
<tr>
<th>Value categories</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilitarian</td>
<td>Practical and material exploitation of nature</td>
<td>Physical sustenance/security</td>
</tr>
<tr>
<td>Naturalistic</td>
<td>Satisfaction from direct experience/contact with nature</td>
<td>Curiosity, outdoor skills, mental/physical development</td>
</tr>
<tr>
<td>Ecological/Scientific</td>
<td>Systematic study of structure, function and relationship in nature</td>
<td>Knowledge, understanding, observational skills</td>
</tr>
<tr>
<td>Aesthetic</td>
<td>Physical appeal and beauty of nature</td>
<td>Inspiration, harmony, peace, security</td>
</tr>
<tr>
<td>Symbolic</td>
<td>Use of nature for metaphorical expression, language, expressive thought</td>
<td>Communication, mental development</td>
</tr>
<tr>
<td>Humanistic</td>
<td>Strong affection, emotional attachment, love for nature</td>
<td>Group bonding, sharing, cooperation, companionship</td>
</tr>
<tr>
<td>Moralistic</td>
<td>Strong affinity, spiritual reverence, ethical concern for nature</td>
<td>Order and meaning in life, kinship and affiliation ties</td>
</tr>
<tr>
<td>Dominionistic</td>
<td>Mastery, physical control, dominance of nature</td>
<td>Mechanical skills, physical prowess, ability to subdue</td>
</tr>
<tr>
<td>Negativistic</td>
<td>Fear, aversion, alienation from nature</td>
<td>Security, protection, safety</td>
</tr>
</tbody>
</table>

*Table 2.1: Biophilia values (Kellert, 1993)*
• egoistic - tendency to protect aspects of the environment that affect the individual personally

• social-altruistic - judging phenomenon based on the costs and/or benefits of a "human" group as a community, nation or state

• biospheric - judging the level of support given with reference to the costs and/or benefits to an ecosystem or biosphere (Stern, Dietz & Kalof, 1993; Schultz & Zelezny, 2003).

<table>
<thead>
<tr>
<th>SVT values</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power</strong></td>
<td>Social status and prestige, control or dominance over people and resources</td>
<td>Social power, authority and wealth</td>
</tr>
<tr>
<td><strong>Achievement</strong></td>
<td>Personal success through demonstrating competence according to social standards</td>
<td>Successful, capable, ambitious, influential</td>
</tr>
<tr>
<td><strong>Hedonism</strong></td>
<td>Pleasure and sensuous gratification for oneself</td>
<td>Pleasure, enjoying ones life</td>
</tr>
<tr>
<td><strong>Stimulation</strong></td>
<td>Excitement, novelty and challenge in life</td>
<td>Daring, a varied life, and exciting life</td>
</tr>
<tr>
<td><strong>Self-direction</strong></td>
<td>Independent thought and action-choosing, creating, exploring</td>
<td>Creativity, freedom, independent, curious, choosing own goals</td>
</tr>
<tr>
<td><strong>Universalism</strong></td>
<td>Understanding, appreciation, tolerance and protection of the welfare of all people and nature</td>
<td>…a world at peace, a world of beauty, unity with nature, protecting the environment</td>
</tr>
<tr>
<td><strong>Benevolence</strong></td>
<td>Preservation and enhancement of the welfare of people with whom one is in personal contact with</td>
<td>Helpful, honest, loyal, forgiving, responsible</td>
</tr>
<tr>
<td><strong>Tradition</strong></td>
<td>Respect, commitment and acceptance of the customs and ideas that traditional culture or religion provide the self</td>
<td>Humble, accepting my portion in life, respect for tradition, moderate</td>
</tr>
<tr>
<td><strong>Conformity</strong></td>
<td>Restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms</td>
<td>Politeness, obedient, self-discipline, honoring parents and elders</td>
</tr>
<tr>
<td><strong>Security</strong></td>
<td>Safety, harmony and stability of society, of relationships and self</td>
<td>Family security, national security, social order, clean, reciprocation of favors</td>
</tr>
</tbody>
</table>

*Table 2.2: Schwartz values (reprinted from Bardi & Schwartz 2003)*
In an international study that measured these 3 categories across Latin America, Europe, Canada and others (Schultz & Zelezny, 1999, Schultz, 2001) social altruistic concerns were ranked the highest in response to environmental problems with groups being identified as "children", "future generations", "people in my community", etc. In results of the ranking between egoistic and biospheric concerns - US and Canada as well as some of the larger European countries scored higher with egoistic concerns where as Latin American countries scored higher in biospheric concerns (Schultz, 2002). The values associated with the biophilia hypothesis as well as the SVT values can also fall into these three categories. As illustrated in Figure 2.2, one end of the scale depicts two circles that simply lie side by side and do not interact at all. This could describe an individual as egoistic (Stern, Dietz & Kolof, 1993), valuing power and status (Schwartz, 1992) or dominionistic (Kellert, 1993). On the other end of the scale is one circle representing self and nature as an equal part of an individual’s existence. In this case, the relationship could be viewed as biospheric in nature (Stern, Dietz & Kolof, 1993), universalist (Schwartz, 1992) or as aesthetic or humanistic (Kellert, 1993).

Figure 2.2: Inclusion of Nature in Self Scale (Schultz, 2002)
Values and Attitudes

Before the connection to this body of research is made, a concrete definition of what values are in relation to studies of the social sciences must be determined. At its broadest sense, two very basic definitions of values are

- important life goals and principles (Rokeach, 1973)
- standards which serve as guiding principles in a person's life (Schwartz, 1992) which can be described as "equality", "wisdom", and/or "freedom"

From here, a variety of more specific and applicable definitions can be formed and utilized depending on their purpose. Values designated as "environmental" and those words and concepts that are associated with it will lead this next part of the discussion.

From the field of Environmental Psychology, Schultz (2004) defined as environmental, those values that are related to or in conjunction with environmental attitudes and concerns. This brings up the necessary discussion of the subtle differences between attitudes and values. As stated above, values are important life goals and principles. Attitudes, as described in a similar manner are:

- a person's judgment about a particular entity expressed in degrees of agreement and/or favor (Eagley & Chaiken, 1993)

Environmental attitudes as described by Schultz (2008) are a "collection of beliefs, affect and behavioral intention a person holds regarding environmentally related activities or issues". Schwartz (1994 in Schultz, 2004, p. 32) connects attitudes and values in such a way that identifies a value as an "organizing system of attitudes and beliefs" as well as "determinants of attitudes". When focusing on environmental concerns, the connection
between values and attitudes can be proposed as environmental values have the power to
direct environmental attitudes (possible actions with regard to a particular issue or
concern that an individual holds true).

**Value Research in Zoos**

Although many authors allege that education has become the focus of many zoos, Falk
(2006) discusses how visitors, on the other hand, don't necessarily consider it to be their
main reason for visiting. Education may manifest itself within the visit itself but may not
be a goal or central reason for the visit (Morgan & Hodgkinson, 1999). It was proposed
in a recent body of research that zoo visitors approach their experience with the broad
expectation of creating and/or enhancing their relationship with the biological world in
general (Fraser, Gruber & Condon, 2008) in an effort to reconnect with it. In support of
this concept are the results reported by Falk, Heimlich & Bronnenkant (2008) in a study
on the impact of a visit to a zoo. As a result of a 3 year nationwide, NSF funded study in
which data were collected from over 5,500 visitors at 12 AZA-accredited institutions,
several contributory findings were offered:

- 61% of visitors found that their zoo experience supported and reinforced their
  values and attitudes towards conservation
- visits to zoos prompted many (54%) to reconsider their role in conservation action
  and to be part of the solution
- 42% believed that zoos play an important role in conservation education and
  animal care
• 57% of visitors said their experience at a zoo strengthened their connection with nature

These findings are not only strong with reference to the Fraser et al (2008) study but also correlate with the ideas behind biophilia and the other concepts discussed in earlier paragraphs above. Another study that supports the role of connectedness to nature and values as a concrete way to measure the adult zoo experience is one put forth by Bruni, Fraser & Schultz (2008) which recognized that expectations from zoo visitors are becoming more complex - that what used to be labeled as a satisfying experience has changed over the years. This study however, suggests that a variety of challenges face researchers who strive to measure connections between zoo visits, connectedness with nature and environmental values. One of interest is the distinction between explicit and implicit connections to nature and zoo visits. The findings from their study suggest that any increase in connectedness with nature that a zoo visit may produce is implicit, and therefore not obvious through traditional methods of observation, surveys and interviews based on terms of whether a visit was "satisfying". Bruni, Fraser & Schultz (2008) used the Implicit Association Test (IAT) to measure this implicit connection, which focuses on the unconscious association between concepts and words and the reaction time necessary to respond to them. This method has been found to be useful in accounting for implicit tendencies. Another way to potentially measure underlying ideals that may reveal an individual's connection with nature is to explore the level of environmental values (i.e. conservation concerns) of zoo visitors. A major study recently published by Fraser & Sickler (2009) used value scales to reveal telling data concerning a variety of areas of focus with regard to zoo visitors. They applied a similar scale to exploring values
surrounding topics such as zoos as a source of environmental messaging, personal and family connections, interpersonal bonding and social capital, connection with nature and animals, teaching, learning and skill development and finally, morality. For each of these topics, varying groups of visitors and related professionals were asked to participate. Of most interest here were the results from environmental messaging, personal values, connection with nature and animals, and teaching and learning. Table 2.3 summarizes the results from these three topics focusing on the responses from the general public.

<table>
<thead>
<tr>
<th>General public responses with focus on zoos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental messaging</td>
</tr>
<tr>
<td>- places to educate about animals and habitat</td>
</tr>
<tr>
<td>- is important in international conservation efforts to preserve species</td>
</tr>
<tr>
<td>Personal values</td>
</tr>
<tr>
<td>- places to care about, appreciate and learn living animals</td>
</tr>
<tr>
<td>Connection with nature and animals</td>
</tr>
<tr>
<td>- places to appreciate living animals</td>
</tr>
<tr>
<td>- to experience nature and living animals</td>
</tr>
<tr>
<td>Teaching, learning and skill development</td>
</tr>
<tr>
<td>- to educate individuals about animals and habitat</td>
</tr>
<tr>
<td>- to help children learn about the natural world</td>
</tr>
</tbody>
</table>

*Table 2.3: Summary of value-based responses* (Fraser & Sickler, 2009)

One gap across the research reviewed regarding values and human connection with nature was any preference with reference to methods of learning about the intended conservation issues. Would examining the level of value an individual places on a funnel of topics possibly reveal helpful data in uncovering this concept? Would examining the level of value an individual places on a funnel of topics (from a broad topic to a narrow, focused issue) possibly reveal helpful data in uncovering this concept? This phase of the research hopes to lend insight to this question.
CHAPTER 3

METHODOLOGY

This study was an exploratory descriptive study with emergent characteristics. The research was designed to answer the over-arching question of what influences the attention of visitors to videos containing conservation messages in zoo exhibits. Two phases of this study were conducted to address the proposed question from two different angles - one practical and one conceptual.

Research Site

Both phases were conducted at the Columbus Zoo & Aquarium in Columbus, OH - a large zoo located in the far northwestern section of Columbus proper about 20 miles from the city center. Currently, the zoo owns approximately 578 acres with just under 100 acres developed for visitors. This institution is an internationally acclaimed conservation, educational and cultural organization, which serves over 1.5 million visitors per year, and also makes substantial contributions to the preservation of the world's wildlife and habitats (B. Revard, Personal Communication, July, 2009). Because of this dedication to conservation action as well as the education of its visitors, this was determined to be an ideal site to conduct the research.
Participants

Participants in both studies were adult zoo visitors to the aforementioned zoo during the 2008 and 2009 summer seasons. Adult visitors were approached as individuals regardless of composition of group. A minimum number of 350 and 250 individuals were desired for each phase respectively. These totals were determined by a power sample based on the number of factors within each instrument. The first phase also included a second population of a panel of experts from the areas of visitor studies, planning and design departments (zoo), education departments (zoo), professional interpretive design companies, and members from the field of learning through technology.

Conditions of study

Phase 1

Using the "continual ask" method of sampling, adult visitors (over the age of 18) were asked to participate in the study by filing out a questionnaire. Researchers were located at the exit of the zoo as to approach visitors with general reassurance that they were at the end of their experience at the zoo on that particular day. Approaching at the exit were important to the study because it was felt that the most accurate responses would come from those visitors that had the opportunity to visit as many exhibits possible in the time allotted for their day at the zoo. Adult visitors (over the age of 18) were asked to participate in the study by filling out a questionnaire. Approximately 97% of questionnaires received were used. 13 questionnaires out of 399 were incomplete and therefore unusable in the data analysis leaving 386 to contribute to the research.
Although questionnaires were given to the second population via email, the data were not included in this study as the results were inconclusive.

Phase 2

Adult zoo visitors were approached by the researcher in three different locations throughout the zoo. These locations were chosen on the day of data collection based on crowd levels in each area. The first location was the outside area next to the elephant yard during the baby elephant viewing hours. The second area was inside Asia Quest across from the Flying Foxes exhibit and the third location was just inside the Manatee Building. Gender, specific age and any other demographic identifiers were not necessary for this study and therefore not noted.

Instrumentation

Phase 1

This phase used a questionnaire to establish both importance and preference for each factor ( Appendix 1). The design factors were identified from the literature. A total of 13 factors were included in this study. Figure 3.1 contains these factors. A 7-point unipolar ranking scale was used to measure the level of importance visitors placed on factors with reference to their decision to stop and watch a video. The participant was instructed to read a single statement regarding each factor (defined in the instrument) and then asked to circle a number on the scale that best represents the level of importance they would place in reference to how much that factor would influence them to stop and watch a video.
The second part to each factor inquiry asked multiple selection questions to note visitor preferences related to application of certain factors. There were 14 statements with 2-4 response choices for each. The participant was asked to choose their preference regardless of the level of importance they placed on the previous item. Table 3.1 contains the statements and choices given to the participants.

**Phase 2**

For the second phase, value-based inquiry statements were designed by the researcher based on the literature to reflect personal values with regard to four topics related to the zoo and conservation issues (Appendix 2). These statements are organized from broad to narrow topics as shown in Figure 3.2. The first statement started at a broad level of inquiry of zoos as part of the community and ended with a narrower focus of how individuals receive intended messages. Instructions were placed at the top of each survey and the participants were asked to rate these statements individually on an 11-point Likert-type scale based on their level of agreement with each statement.
<table>
<thead>
<tr>
<th>DESIGN FACTOR</th>
<th>PREFERENCE STATEMENT</th>
<th>PREFERENCE CHOICES</th>
</tr>
</thead>
</table>
| LOCATION         | I would prefer to watch a video…                                                    | a. near the entrance of the exhibit  
                        |                                                                                  | b. near the animal viewing area  
                        |                                                                                  | c. near the exit of exhibit |
| FORMAT           | I would prefer to view a video that…                                                 | a. is playing continuously  
                        |                                                                                  | b. I start myself  
                        |                                                                                  | c. is on a timed schedule |
| SOUND            | I would prefer speakers that were…                                                   | a. mounted within the video kiosk  
                        |                                                                                  | b. mounted outside the video kiosk  
                        |                                                                                  | c. embedded in headphones |
| SETTING          | I would be more likely to stop and watch if the video was…                          | a. located in a theater  
                        |                                                                                  | b. an individual, free-standing kiosk  
                        |                                                                                  | c. a unit that was mounted/embedded in a wall  
                        |                                                                                  | d. a unit hanging from the ceiling |
| LENGTH OF VIDEO  | I would prefer a video to be…                                                       | a. no more than 1 minute long  
                        |                                                                                  | b. no more than 3 minutes long  
                        |                                                                                  | c. no more than 5 minutes long  
                        |                                                                                  | d. over 5 minutes long |
| CONTENT OF VIDEO | 1. I would prefer conservation messages in a video to be…                            | a. present - with important information regarding conservation programs and efforts  
                        |                                                                                  | b. not-present - I would rather watch a video that did not contain any obvious messages  
                        |                                                                                  | a. repeated throughout  
                        |                                                                                  | b. stated at the beginning and end  
                        |                                                                                  | c. stated at the beginning only  
                        |                                                                                  | d. stated at the end only |
| EXHIBIT SIZE     | I would prefer the size of the exhibit to be…                                         | a. large  
                        |                                                                                  | b. medium  
                        |                                                                                  | c. small |
| EXHIBIT THEME    | I prefer exhibits that are…                                                          | a. completely immersive - makes you feel like you are part of the exhibit  
                        |                                                                                  | b. partially immersive - some details and props are present but are not overwhelming  
                        |                                                                                  | c. not immersive at all - just give me the facts about what I'm looking at |
| SEATING          | I would prefer…                                                                       | a. no seating  
                        |                                                                                  | b. bench-style seating  
                        |                                                                                  | c. theater-style seating |
| CROWD LEVEL      | I would be more likely to stop and watch a video if there were…                      | a. just one or two people watching video  
                        |                                                                                  | b. 5-10 people watching the video  
                        |                                                                                  | c. over 10 people watching the video |
| EXHIBIT APPEARANCE | I would be more likely to stop at an exhibit with…                                  | a. the presence of bright colors  
                        |                                                                                  | b. presence of different shapes, patterns and textures  
                        |                                                                                  | c. presence of labels and text panels |
| ANIMALS          | I would be more likely to stop and watch a video if…                                | a. no animals were on display within exhibit area  
                        |                                                                                  | b. a single animal was on display within exhibit area  
                        |                                                                                  | c. multiple animals were on display within exhibit area  
                        |                                                                                  | d. exotic/rare species were on display within exhibit area |
| INTERACTIVE FEATURES | I would prefer to have…                                                           | a. interactive features present - such as on screen quizzes, touch screens  
                        |                                                                                  | b. a straight, informative video |

*Table 3.1: Preference statements and choices as given to the visitor in Phase 1*
Data Analysis

Data were analyzed for central tendencies using SPSS 17.0 including frequencies, means, medians, and standard deviations. Correlational analysis was also included in Phase 2.
CHAPTER 4

PHASE 1 - proposed article for publication

Factors that influence the viewing of video containing conservation messages in zoo exhibits by visitors.

ABSTRACT

Educating their visitors on species conservation is one of the primary goals of most reputable zoos or aquariums in the country. The manner in which they accomplish this varies from institution to institution. The purpose behind this study was to identify whether video is an effective means of communicating conservation messages in a zoo environment by investigating factors that may influence the viewing of videos containing these messages by visitors. This was accomplished in two phases - first, design factors from the literature that successfully contribute to the effectiveness of zoo exhibits were identified. A questionnaire was then designed to test these factors and their effectiveness specifically against video containing conservation messages in zoo exhibits. It instructed adult zoo visitors to rank the factors according to what would most influence them to stop and watch a conservation-oriented video in an exhibit.
The results of this study can be utilized in both large and small-scale institutions that are considering (or have already considered) introducing video into their exhibit development plans with the purpose of conservation education. It is intended to not only lend insight into how visitors internalize messaging at a non-formal learning institution, but also to assist design and planning teams within these institutions to understand both the similarities and differences of their thought processes to that of the visitor.

INTRODUCTION

Effectively relaying conservation messages to their visitors has always been an important goal of most zoos accredited by the Association of Zoos and Aquariums (AZA). Traditionally, messages are delivered using signs, labels and graphics in exhibits, but it has been surmised that visitors have a low probability of actually paying any attention to these methods - in many cases as few as 10% (Bitgood, Benefield, Patterson & Litwak, 1990). It has also been reported however, that if proper design factors are applied, the likelihood of attention to these signs increases (Bitgood, 1991; Serrell, 1988) and through increased attention, learning is more likely to occur.

Video in zoo exhibits is another source that is often used to pass along conservation messages to visitors. However, similar concern regarding low attention to video exists. Before attempting to assess any knowledge gain from the use of video, design factors known to contribute to successful exhibit design and applying them to the presence of video in zoo exhibits must be established. This is what creates the basis for this research.
There were two phases to this research. The initial phase began with a thorough search of the literature to identify design factors that contributed to the success of zoo exhibits. Once identified, the second phase directed zoo visitors to rank the factors based on what would influence them to stop and watch a video in an exhibit. This was accomplished through a questionnaire designed to rate the levels of importance as well as preference choices placed on each of the identified factors.

**Design Factors as applied to video in zoo exhibits**

There is a fair amount of research that contributes to what makes a successful exhibit. One critical question to be asked about this statement is not only what makes a successful exhibit but also what is a successful exhibit - how exactly is success defined in the eyes of the designers as well as the visitor and do they agree with each other. Bitgood, (1994), describes the criteria for success as two fold - measures observed in the visitor as well as appraisal by experts. He goes on to identify that visitor measures include behavioral (viewing time, attraction, etc), knowledge gain (recall and reason), and affect (attitude change). The knowledgeable leaders that are typically used in judging the success of exhibits tend to be from three associated fields - that of visitor studies, an expert in the subject matter at hand (a specific object, animal or issue for example), and the artist or designer. It is in part, from this basic groundwork that specific principles or, in the case of this research, factors, were defined as contributing to exhibits that were deemed successful. These factors are expansive and typically empirical - not theoretical. They can be divided into three categories - exhibit design factors, visitor oriented factors and architectural factors (Patterson & Bitgood, 1989).
As the literature on factors in exhibit design is numerous, finding literature specifically on any aspect of the success of video as a source to convey messages in exhibits is challenging and adding the element of video in zoo exhibits compounds this challenge. Questions that surface regarding the use of video in zoos, the way in which video is used in zoo exhibits and the success of those videos in reference to what their impact on visitors are often considered parallel to those asked of general exhibit components in nonformal learning institutions. This contributes to the inference that video use in zoos has actually not been critically considered up to this point.

In an early study, Miles (1990) reported on evaluations carried out on the use of "audiovisuals" (AV) in three different exhibits in the 70s and 80s. He defined these AVs as the use of slide-tape or videotape. In order to complete these evaluations, possible design variables that were isolated based on "experience" at The Natural History Museum in London were used. This was the only article found that actually described factors as related to video as a specific component of exhibit design. The list of factors, as well as a brief description of how, in this research, they were defined in relation to the presence of video in an exhibit, as well as their source, is found in Table 4.1 below. These six factors were found, in some cases, to overlap and expand upon those that applied to general exhibit design and were used in combination with them as follows. Table 4.2 contains these other common design factors recognized from the literature (Patterson & Bitgood, 1988). These factors, in combination with those in Table 1, were identified as those that
contributed to the design of successful exhibits and were used as the base for the
development of the instrument used in this study.

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>DESCRIPTION</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>- where the video is located</td>
<td>Miles, (1990)</td>
</tr>
<tr>
<td>Format</td>
<td>- is the video user-started, continuous or on a timed schedule</td>
<td></td>
</tr>
<tr>
<td>Audio</td>
<td>- is the audio contained in internal or external speakers or in a headset</td>
<td></td>
</tr>
<tr>
<td>Setting</td>
<td>- how is the video housed in a kiosk, embedded in a wall or hanging from the ceiling</td>
<td></td>
</tr>
<tr>
<td>Length of video</td>
<td>- how long is the video</td>
<td></td>
</tr>
<tr>
<td>Content of video</td>
<td>- is there a message present and how often is it repeated throughout the video</td>
<td></td>
</tr>
</tbody>
</table>

*Table 4.1: Exhibit factors and descriptions as applied to video, Miles, 1990*

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>DESCRIPTION</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhibit size</td>
<td>- how big is the exhibit</td>
<td>Bitgood et al, (1996)</td>
</tr>
<tr>
<td>Exhibit theme</td>
<td>- what is the level of immersion, presence of props and realism of display in the exhibit</td>
<td>Coe, (1985)</td>
</tr>
<tr>
<td>Crowd level</td>
<td>- number of visitors around the video at one time</td>
<td>Patterson &amp; Bitgood (1989)</td>
</tr>
<tr>
<td>Aesthetic factors</td>
<td>- presence of colors, textures and patterns</td>
<td></td>
</tr>
</tbody>
</table>

*Table 4.2: Exhibit factors, descriptions and sources as applied to exhibit design*
Research Questions

The over-arching research question guiding this research is “What influences visitor attention to conservation messages from videos in zoo exhibits?”

The sub-questions for this research are:

- Does video support conservation messaging in institutions such as zoos & aquariums?
- What design factors from the literature are used in exhibit development and design?
- What design factors are considered of importance to the zoo visitor when making the decision to stop and watch a video?
- Do visitors have strong preferences regarding choices surrounding exhibit design principles?

Purpose of Study

This study addressed the question of design factors that might influence the visitor choice to view a video containing conservation messages in a zoo. The literature strongly suggests that certain principles of design (factors) do contribute to the success of exhibits but very little addresses the application of these factors to the component of conservation-oriented videos in exhibits, it is the hope that the findings of this study will begin to lend insight and fill in this gap
METHODOLOGY

Research Site

This study was conducted at the Columbus Zoo & Aquarium (CMZ) in Columbus, OH. This institution is an internationally acclaimed conservation, educational and cultural organization, which not only serves over 1.5 million visitors per year, but also makes substantial contributions to the preservation of the world's wildlife and habitats. Because of this dedication to conservation action as well as educating its visitors, this was determined to be an ideal site to conduct the research at hand.

Participants and Conditions of Study

During the summer of 2008, a total of 399 adult zoo visitors were asked to participate in this study. This was accomplished by using the "continual ask" method of sampling. The total number of participants was determined by a power sample based on the number of factors in the instrument. Researchers were located at the exit of the zoo as to approach visitors with general reassurance that they were at the end of their experience at the zoo on that particular day. Approaching at the exit were important to the study because it was felt that the most accurate responses would come from those visitors that had the opportunity to visit as many exhibits possible in the time allotted for their day at the zoo. Adult visitors (over the age of 18) were asked to participate in the study by completing a questionnaire. Approximately 97% of questionnaires received were used with 13 questionnaires incomplete and therefore unusable in the data analysis. There were a total of 386 completed instruments. Concurrently, 21 experts representing backgrounds of visitor studies, planning and design departments (zoo), education...
departments (zoo), professional interpretive design companies, and members from the field of learning through technology were also asked to complete the instrument via electronic communication. After analysis however, data revealed that scores from the expert panel were either regressing to the mean or in disagreement with each other - even, in some cases, between individuals within similar fields. As a result, it was determined that the focus for this research would be on the data gathered from the adult zoo visitors and further study would need to be conducted regarding the experts in order to draw definitive conclusions.

**Instrument**

A questionnaire was developed from design factors found in the literature to establish importance and preference for each based on the presence of a video component located within the exhibit. This was accomplished by developing two parts for each design factor.

*Importance*

A 7-point unipolar ranking scale was built from the preference choices identified in the literature. This was used to measure the level of importance visitors placed on factors with reference to their decision to stop and watch a video (1 being "of least importance", 7 being "most important"). The participant was instructed to read a single statement regarding each of the 13 design factors (each instrumentally defined in the instrument) and then asked to circle a number on the scale that best represents the level of importance they would place in reference to how much that factor would influence them to stop and
watch a video in an exhibit. This data were then analyzed using SPSS 17.0, where mean scores and standard deviation were calculated. Figure 4.1 contains the 13 factors.

<table>
<thead>
<tr>
<th>EXHIBIT THEMING</th>
<th>INTERACTIVE FEATURES</th>
<th>ANIMAL PRESENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CROWD LEVEL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXHIBIT SIZE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIDEO LENGTH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOCATION OF VIDEO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FORMAT OF VIDEO</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

13 FACTORS

FIGURE 4.1: IDENTIFIED DESIGN FACTORS USED IN STUDY

Preferences

Multiple selection questions were used to note visitor preferences with regard to the presence of video. There were 14 questions with 2-4 response choices for each. The participant was asked to choose their preference regardless of the level of importance they placed on the previous item. Table 4.3 contains the preference items and choices.

RESULTS

This research addressed the over-arching question of “What influences visitor attention to conservation messages from videos in zoo exhibits?” The questionnaire used to gather the data for this study was designed to reveal both level of importance and preference related to the main research question. There were two intended results of establishing both importance and preference for each design factor. The first was to understand if any of these factors even made a difference to the visitors and the second, regardless of the level of importance visitors placed on them personally, what preference they would have
concerning specific details of each design factor with regard to video. Because conservation messages were part of the core of the study, the data from the items on conservation were individually analyzed.

Basic quantitative analyses were performed for each design factor that addressed areas including mean score from the importance scale for each design factor, common - least common preference choice rating for each design factor, % representation of favored preference choices among participants and highlighted explanation of analysis of content (conservation messaging) design factor.

**Importance Scale**

The first analysis concerned the degree to which individuals felt each design factor was important to them. Table 4.4 contains the mean score per factor from the 7-point importance scale in diminishing rank order. The data show that there was not a great difference among the thirteen factors, each falling relatively within the middle range of the 7-point scale. The four factors that were of most and least importance to visitors in the decision to stop and watch a video are found in Table 4.5.

**Preference Choices**

Data was analyzed to identify the choices noted as the most common among those who participated in the survey. Table 4.6 contains the top preference choices with regard to each factor.
<table>
<thead>
<tr>
<th>FACTOR</th>
<th>VISITOR PREFERENCE</th>
</tr>
</thead>
</table>
| Location               | a. near the entrance  
                          b. near the animal viewing area  
                          c. near the exit |
| Format of video        | a. is playing continuously  
                          b. I start myself  
                          c. is on a timed schedule |
| Presence of sound      | a. mounted within the video kiosk  
                          b. mounted outside the video kiosk  
                          c. embedded in headphones |
| Setting                | a. located in a theater  
                          b. an individual, free-standing kiosk  
                          c. a unit that was mounted/embedded in a wall  
                          d. a unit hanging from the ceiling |
| Length of video        | a. no more than 1 minute long  
                          b. no more than 3 minutes long  
                          c. no more than 5 minutes long  
                          d. over 5 minutes long |
| Content of video       | a. present - with important information regarding conservation programs and efforts  
                          b. not-present - I would rather watch a video that did not contain any obvious messages |
| Repetition of message  | a. repeated throughout  
                          b. stated at the beginning and end  
                          c. stated at the beginning only  
                          d. stated at the end only |
| Exhibit size           | a. large  
                          b. medium  
                          c. small |
| Exhibit theme          | a. completely immersive - makes you feel like you are part of the exhibit  
                          b. partially immersive - some details and props are present but are not overwhelming  
                          c. not immersive at all - just give me the facts about what I'm looking at |
| Presence of seating    | a. no seating  
                          b. bench-style seating  
                          c. theater-style seating |
| Crowd level            | a. just one or two people watching video  
                          b. 5-10 people watching the video  
                          c. over 10 people watching the video |
| Exhibit aesthetics     | a. the presence of bright colors  
                          b. presence of different shapes, patterns and textures  
                          c. presence of labels and text panels |
| Presence of animals    | a. no animals were on display within exhibit area  
                          b. a single animal was on display within exhibit area  
                          c. multiple animals were on display within exhibit area  
                          d. exotic/rare species were on display within exhibit area |
| Interactive features   | a. interactive features present - such as on screen quizzes, touch screens  
                          b. a straight, informative video |

Table 4.3: Design factors and preference choices
Conservation messages as content

Since this research surrounded the concept of conservation messaging within video, particular attention was paid to the results of those data that specifically related to this question. Figure 4.2 illustrates the specific results of the importance scale for visitors regarding the video content as a design factor. Mean score plus the ranking among the other factors are reported here. Figure 4.3 contains the details of the preference choices surrounding conservation messaging in video.
<table>
<thead>
<tr>
<th>FACTOR</th>
<th>VISITOR PREFERENCE</th>
<th>%  (N=386)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>a. near the entrance</td>
<td>31.3</td>
</tr>
<tr>
<td></td>
<td>b. near the animal viewing area</td>
<td><strong>40.2</strong></td>
</tr>
<tr>
<td></td>
<td>c. near the exit</td>
<td>28.5</td>
</tr>
<tr>
<td>Format of video</td>
<td>a. is playing continuously</td>
<td><strong>48.9</strong></td>
</tr>
<tr>
<td></td>
<td>b. I start myself</td>
<td>41.7</td>
</tr>
<tr>
<td></td>
<td>c. is on a timed schedule</td>
<td>9.3</td>
</tr>
<tr>
<td>Presence of sound</td>
<td>a. mounted within the video kiosk</td>
<td><strong>37.6</strong></td>
</tr>
<tr>
<td></td>
<td>b. mounted outside the video kiosk</td>
<td>27.2</td>
</tr>
<tr>
<td></td>
<td>c. embedded in headphones</td>
<td>35.2</td>
</tr>
<tr>
<td>Setting</td>
<td>a. located in a theater</td>
<td>15.5</td>
</tr>
<tr>
<td></td>
<td>b. an individual, free-standing kiosk</td>
<td>31.3</td>
</tr>
<tr>
<td></td>
<td>c. a unit that was mounted/embedded in a wall</td>
<td><strong>43.3</strong></td>
</tr>
<tr>
<td></td>
<td>d. a unit hanging from the ceiling</td>
<td>9.8</td>
</tr>
<tr>
<td>Length of video</td>
<td>a. no more than 1 minute long</td>
<td>21.2</td>
</tr>
<tr>
<td></td>
<td>b. no more than 3 minutes long</td>
<td><strong>59.3</strong></td>
</tr>
<tr>
<td></td>
<td>c. no more than 5 minutes long</td>
<td>16.8</td>
</tr>
<tr>
<td></td>
<td>d. over 5 minutes long</td>
<td>2.6</td>
</tr>
<tr>
<td>Content of video</td>
<td>a. present - with important information regarding conservation programs and efforts</td>
<td><strong>63.0</strong></td>
</tr>
<tr>
<td></td>
<td>b. not-present - I would rather watch a video that did not contain any obvious messages</td>
<td>37.0</td>
</tr>
<tr>
<td>Repetition of message</td>
<td>a. repeated throughout</td>
<td>12.4</td>
</tr>
<tr>
<td></td>
<td>b. stated at the beginning and end</td>
<td><strong>46.1</strong></td>
</tr>
<tr>
<td></td>
<td>c. stated at the beginning only</td>
<td>18.1</td>
</tr>
<tr>
<td></td>
<td>d. stated at the end only</td>
<td>23.3</td>
</tr>
<tr>
<td>Exhibit size</td>
<td>a. large</td>
<td>25.4</td>
</tr>
<tr>
<td></td>
<td>b. medium</td>
<td><strong>58.0</strong></td>
</tr>
<tr>
<td></td>
<td>c. small</td>
<td>16.6</td>
</tr>
<tr>
<td>Exhibit theme</td>
<td>a. completely immersive - makes you feel like you are part of the exhibit</td>
<td>44.0</td>
</tr>
<tr>
<td></td>
<td>b. partially immersive - some details and props are present but are not overwhelming</td>
<td><strong>48.5</strong></td>
</tr>
<tr>
<td></td>
<td>c. not immersive at all - just give me the facts about what I'm looking at</td>
<td>7.5</td>
</tr>
<tr>
<td>Presence of seating</td>
<td>a. no seating</td>
<td>28.0</td>
</tr>
<tr>
<td></td>
<td>b. bench-style seating</td>
<td><strong>69.2</strong></td>
</tr>
<tr>
<td></td>
<td>c. theater-style seating</td>
<td>7.5</td>
</tr>
<tr>
<td>Crowd level</td>
<td>a. just one or two people watching video</td>
<td>35.5</td>
</tr>
<tr>
<td></td>
<td>b. 5-10 people watching the video</td>
<td><strong>58.3</strong></td>
</tr>
<tr>
<td></td>
<td>c. over 10 people watching the video</td>
<td>6.2</td>
</tr>
<tr>
<td>Exhibit aesthetics</td>
<td>a. the presence of bright colors</td>
<td><strong>43.3</strong></td>
</tr>
<tr>
<td></td>
<td>b. presence of different shapes, patterns and textures</td>
<td>37.0</td>
</tr>
<tr>
<td></td>
<td>c. presence of labels and text panels</td>
<td>19.7</td>
</tr>
<tr>
<td>Presence of animals</td>
<td>a. no animals were on display within exhibit area</td>
<td>7.5</td>
</tr>
<tr>
<td></td>
<td>b. a single animal was on display within exhibit area</td>
<td>27.5</td>
</tr>
<tr>
<td></td>
<td>c. multiple animals were on display within exhibit area</td>
<td><strong>53.1</strong></td>
</tr>
<tr>
<td></td>
<td>d. exotic/rare species were on display within exhibit area</td>
<td>12.7</td>
</tr>
<tr>
<td>Interactive features</td>
<td>a. interactive features present - such as on screen quizzes, touch screens</td>
<td><strong>46.6</strong></td>
</tr>
<tr>
<td></td>
<td>b. a straight, informative video</td>
<td><strong>53.4</strong></td>
</tr>
</tbody>
</table>

*Table 4.6: Top preference choices and % values*
FINDINGS

Importance of Design Factors

The results of the analysis of the importance scale revealed that the mean score for 11 out of the 13 factors fell between 4 and 6. This could indicate that visitors are indifferent to watching a video in general and even those design factors that have been researched
previously as contributing to successful exhibits aren't likely to influence them with respect to watching a video one way or another. The top and bottom four factors, their mean scores and standard deviation are listed in Table 4.7 below.

<table>
<thead>
<tr>
<th>TOP-RANKED FACTORS</th>
<th>Mean Score</th>
<th>Std. Deviation</th>
<th>BOTTOM-RANKED FACTORS</th>
<th>Mean Score</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video Length</td>
<td>5.39</td>
<td>1.49</td>
<td>Video Content</td>
<td>4.38</td>
<td>1.61</td>
</tr>
<tr>
<td>Crowd Level</td>
<td>5.21</td>
<td>1.50</td>
<td>Exhibit Aesthetics</td>
<td>4.32</td>
<td>1.75</td>
</tr>
<tr>
<td>Presence of Seating</td>
<td>5.01</td>
<td>1.54</td>
<td>Exhibit Size</td>
<td>3.95</td>
<td>1.77</td>
</tr>
<tr>
<td>Presence of Animals</td>
<td>4.73</td>
<td>1.76</td>
<td>Presence of Interactive Features</td>
<td>3.84</td>
<td>1.86</td>
</tr>
</tbody>
</table>

Table 4.7: Top and bottom ranked importance scale findings

Top-ranked factors

When closely examined, one trend that appears to emerge with three out of the four of these factors is that length of video, crowd level and presence of seating can all be considered to revolve around comfort and convenience to the visitor. Notably, each of these factors also received over a mean score of five except the last - presence of animals. This is supported by Bennett (2007) in a study that investigated whether video enhanced the visitor experience in a zoo. Four conclusionary trends were identified from this study - two of which related to these findings. First, it was identified that crowd level did play a role among the participants of the study in that they would have been more likely to watch the video if they came on less crowded days so they could pay closer attention to
the video and enjoy it. A second trend emerged from the same study in that the placement and surroundings of the video kiosk was important - visitors suggested that the kiosks should be in theater-like settings separated from the animal exhibits.

**Bottom-ranked factors**

Bitgood & Patterson (1987) report that the presence of interactive elements in exhibits do typically produce increased visitor attention. If an interactive activity was present in an exhibit that also contained video, there is strong evidence that the video may actually be overlooked altogether because visitors may be involved with the interactive units. Bitgood (1999) then states that exhibit size influences visitors on a more emotional level - that it may translate to "perceived animal welfare" (p 2). This may be one reason why it does not influence. The fact that video content scored low was not surprising. In the 2007 Bennett study mentioned above, visitors were asked what they remembered about any of the videos they may have watched. The comments that appeared to be most common used descriptors such as "cute" or "entertaining" and that the videos were designed for younger kids and finally, that they were short - "which was good". This supports current finding that content fell towards the bottom of the scale.

**Preference Choices**

Preference choices were analyzed by identifying which choice of condition was most preferred for each design factor. Keeping in mind that participants were asked to make these choices regardless of the level of importance they placed on them, identifying trends proved challenging specifically because it was a natural tendency to want to refer
back to the level of importance. The analysis for this section refers to the strength of the common responses with respect to how many participants marked that choice. The four top preferences, preference choices, and the % of responses that they received are listed in Table 4.8 and the four bottom are in Table 4.9.

<table>
<thead>
<tr>
<th>TOP-RANKED PREFERENCES</th>
<th>TOP-RANKED PREFERENCE CHOICE</th>
<th>% of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of seating</td>
<td>Bench-style seating</td>
<td>69.2</td>
</tr>
<tr>
<td>Content of video</td>
<td>Conservation message present</td>
<td>63.0</td>
</tr>
<tr>
<td>Length of video</td>
<td>No more than 3 minutes long</td>
<td>59.3</td>
</tr>
<tr>
<td>Crowd level</td>
<td>5-10 people watching video</td>
<td>58.3</td>
</tr>
</tbody>
</table>

*Table 4.8: Top-ranked preferences and preference choices*

<table>
<thead>
<tr>
<th>BOTTOM-RANKED PREFERENCES</th>
<th>BOTTOM-RANKED PREFERENCE CHOICE</th>
<th>% of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhibit aesthetics</td>
<td>Presence of bright colors</td>
<td>43.3</td>
</tr>
<tr>
<td>Setting</td>
<td>Unit mounted /embedded in the wall</td>
<td>43.3</td>
</tr>
<tr>
<td>Location</td>
<td>Near the animal viewing area</td>
<td>40.2</td>
</tr>
<tr>
<td>Presence of sound</td>
<td>Mounted within video kiosk</td>
<td>35.0</td>
</tr>
</tbody>
</table>

*Table 4.9: Bottom-ranked preferences and preference choices*

The previous research concerning presence of seating is somewhat debatable because it was found hard to determine the reason why visitors chose to sit - was it because of the video or did they watch the video because they were able to sit down. Another thought with regard to seating is the influence of being at a large zoo like CMZ. Not only is there
is a lot of walking to be done, but combined with the fact that this questionnaire was
given at the end of the participant's visit when they are tired could create an unintentional
bias here. Reported data for both length of video (Miles, 1989) and crowd level
(Patterson & Bitgood, 1988) concluded that in order to accurately measure the effect that
these two factors had on visitors, they would have to be combined with other principals
such as content or situation. Video content is a crucial and individual component of this
research - the results from this factor will be discussed in the next section.

Video Content
As the primary goal of this research focuses on the presence of conservation messaging in
video and the decision made by zoo visitors to stop and watch, it is important that
particular attention was paid to the results of the factor regarding conservation as video
content.

The results of the importance scale inquiry showed that the mean score for video content
fell at 4.32 - just above neutral on the 7-point scale. In comparison to how other factors
ranked video content fell in the lower third of the thirteen factors at #10. It is challenging
to infer how this relates to the literature since there is very little research focused on
video use in museums. One inference that can be made, however, is that since video
tends to demand more attention and time from the experience, more goes into a visitor's
decision to watch a video regardless of the content - which can also be connected to the
fact that video length was rated at the top of the scale. Time is a very valuable
commodity to visitors. It is not as simple as making a decision about the size of the
exhibit or where the video is located within an exhibit in relation to the decision to watch a video. These factors appear to have a less direct impact on preferences compared to comfort or convenience of the visitor.

There were two separate statements regarding preference choices designed for the particular factor of video content in the form of conservation messages. The first statement investigated message present versus not present. Over 60% of participants responded that they would prefer that a conservation message be present in a video. This reaffirms the proposed concept by Fraser et al (2008) that visitors are looking for more in their visit than just moving from exhibit to exhibit watching the animals. Even in their choices regarding what they see, they are looking for substance and meaning. A video containing conservation messages could fill this expectation.

The second statement given to the participant for conservation messages with regard to video content focused on the level of repetition of the message throughout the course of the video. The choices were and the comparative percents of responses indicating preference are found in Table 4.10.

<table>
<thead>
<tr>
<th>Repetition of message</th>
<th>TOP-RANKED PREFERENCE CHOICE</th>
<th>% of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>- repeated throughout</td>
<td>12.4</td>
<td></td>
</tr>
<tr>
<td>- stated at beginning and end</td>
<td>46.1</td>
<td></td>
</tr>
<tr>
<td>- stated at beginning only</td>
<td>18.1</td>
<td></td>
</tr>
<tr>
<td>- stated at the end only</td>
<td>23.3</td>
<td></td>
</tr>
</tbody>
</table>

*Table 4.10: Repetition of message preference choice responses*
It is interesting that the plurality of responses to the statement or content showed a preference for the message to be stated at the beginning and end of the video. Does this imply that visitors do not think they will remember the message from the beginning to end of the video if they stayed throughout? Or does it mean that they need to be able to hear the message, associate it with content and then have it reinforced to them once more at the end? Perhaps it is just that the visitor knows the likelihood that they may or may not arrive at the start of a video or stay throughout, so they would like the opportunity to at least be exposed to the message.

IMPLICATIONS

Research

- individual exhibit design factors should be studied on two planes - first as they apply to exhibits individually and then how they combine to pull the entire story of the exhibit together
- inconclusive results and lack of literature should be an indication that more needs to be done with the use of video in zoo exhibits - currently, out-dated and general research is available but as a result, too many assumptions need to be made which is the cause of many errors in judgment to begin with

Practice

The practical nature of this study would target specific departments in informal learning institutions such as planning and design departments and education departments. It could
also aid outside design departments in understanding the needs of visitors to these institutions as opposed to other clientele they may engage with.

- the results from this study could aid design departments in what to take notice of and what not to make assumptions about. For example, each exhibit design component needs to be addressed individually but with the goal of the entire exhibit in mind - factors could contribute to the failure of an exhibit just as easily as its success if not used in conjunction with the appropriate component. If something works for the video component of an exhibit, it may not for the graphics or signs.

- research and evaluation of all aspects of exhibit design from a variety of perspectives is necessary as its complexity cannot be accurately assessed from a single field or area of interest and expertise.

FUTURE STUDY

As the study progressed, many questions were raised that could result in the expansion of data analysis and act as a baseline for future research projects and could contribute to the very limited body of knowledge.

- develop studies that explore those factors that don't have a firm basis - pulling from the fields informal education, psychology, sociology as well as art and design. For example - the psychological effects of color that may not be apparent from general observation or non-specific survey/interview questions
• further expansion of the research to include explore trends connecting responses from the importance scale to responses from preference choices as well as using semi-structured interviews with zoo visitors to reveal a deeper level of meaning
• with the use of more advanced technology (i.e. the "wow" factor) do intended messages get lost
• would demographics make a difference in the outcome - would the responses from visitors at a smaller zoo, an urban zoo or even a larger zoo display more similarities or differences; even from different parts of the country - east vs. west; rural vs. suburb; open spaces vs. urban, etc.

CONCLUSION
Communicating messages to their visitors and the most effective means of doing this is at the center of much of the research occurring in the fields of visitor studies, informal learning, psychology and the emerging fields of environmental and conservation psychology. The purpose of this study was to examine the design factors that may influence the zoo visitor to stop and watch a video containing conservation messages. Throughout the course of the research, it was discovered that there is very limited literature (and much of it by the same authors) that focuses on video as a component of exhibit design, which adds value and need to the results of this study regardless of the ambiguity of the data that appeared to surface. The findings suggest the following conclusions:
• the isolated exhibit design factors could not be generalized in the use of video as a component of exhibits
• data regarding trends from the design factors did indicate that visitor comfort and convenience both play an important role in decisions visitors make during their visit
• generally, design factors do not play a strong part in influencing a visitor to stop and watch a video - there may be stronger indicators of this such as visitor-centered characteristics (group influence, emotional attachment, time available, etc)
• video is not a consistent source of relaying conservation messages to the visitor
• video does not appeal to all visitors at all exhibits - other "non-design" related factors may come into play such as demographics, group composition, age of children and expectations of visitors

From an earlier study on whether video in zoos enhances the visitor experience, one participant made the comment that they don't bring their family to the zoo to watch "TV" - they can do that at home (Bennett, 2007). From this body of research though, it does appear that, given the right set of circumstances and/or conditions, the visitor will make the decision to watch a video.
CHAPTER 5

STUDY #2 - proposed study for publication

Visitor Connection with Conservation Messages from Video in Zoo Exhibits in Relation to their Personal Values

ABSTRACT

As conservation education continues to be a strong force among zoos that are accredited by The Association of Zoos and Aquariums (AZA), determining how to pass these messages onto their visitors with relative assurance that there is some level of internalization remains in the forefront of inquiry among zoo planning departments and education departments. One such method of exploring this topic that is currently growing in the interdisciplinary fields of visitor studies, informal education as well as in the field of psychology is examining the personal values of zoo visitors. In order to do this effectively, one must begin with a broad understanding of the inherent human connection with the natural world as well as values and their association with issues regarding environmental concerns. Several theories and hypotheses have been established as reliable indicators of these concepts. Applying the basic principles of these theories and introducing the environmental values visitors place on a specific method of exposure to
conservation messages (namely video use in zoo exhibits) is the basis for this research. For the purposes of this study, visitors were asked to complete a value-oriented questionnaire related to zoos, animals, animals in captivity and methods of relaying conservation messaging as part of an exhibit.

INTRODUCTION

Conservation of species and habitat as an issue of environmental concern has been a focus of zoos and other collection-based institutions for the past four decades (Miller et al, 2004). In the same study, the authors recognize that conservation has become a "value-driven discipline" (p. 87). The challenge to researchers however, lies in determining methods to adequately relay intended messages of conservation to zoo visitors and accurately measuring the results of using these methods. Based on the principles surrounding the concepts of biophilia and connectedness to nature, this study builds a relationship between these principles and the level of value zoo visitors place on using video in exhibits to enhance their knowledge and connection to conservation issues. Figure 5.1 illustrates this proposed connection between previously established concepts and the ultimate goal of this study - to determine whether specific personal values of zoo visitors may influence them to stop and watch a conservation-oriented video present in zoo exhibits. By ascertaining the level of value zoo visitors place on specific issues and concerns surrounding conservation of species and correlating it to the value they place on a method of learning about those issues while they are at the zoo, the question of whether values may have influenced that decision to stop and watch can be explored.
Wilson's (1984) biophilia hypothesis states that there is an inherent human need for a connection with living things. Also described as an "innate tendency", this equates biophilia to a hereditary (genetic) need or a vital part of human nature that cannot be altered (Wilson, 1993). Although philosophical in nature, it does become biological and psychological in explanation. Kellert (1993) lends support by associating nine "biologically-based" human values with biophilia to further substantiate legitimacy of the hypothesis. Figure 5.2 illustrates the nine values.

Further study revealed that these nine values are very similar to the motivations that account for values described by Schwartz (1992) in The Schwartz Value Theory (SVT). These values are based on what he terms "the universal requirements of human existence"
Figure 5.2: Human values associated with biophilia (Kellert, 1993)

(Schwartz in Bardi & Schwartz, 2003, p. 1208). Figure 5.3 contains the values from this theory. The similarity between the values associated with biophilia and SVT further substantiates the inference that personal values can be used to determine individual levels of environmental concern.

Schultz (2002) expanded on the notion of biophilia with the concept of connectedness with nature in which an individual assesses his/her own belief structure with regard to the extent they feel part of or connected to the natural environment. There have been several attempts to measure this connection. The Inclusion of Nature in Self (INS) scale developed by Schultz (2002) is one of the more straightforward methods. It consists of a series of overlapping circles labeled as "self" and "nature" (Figure 5.4). Participants are then instructed to indicate which "picture" best represents the way they see their
relationship with nature. Using a tripartite value system proposed in earlier years by Stern, Dietz & Kalof (1993), individuals can then be categorized into three categories based on where they placed themselves in the INS. The three categories are described as:

- egoistic - tendency to protect aspects of the environment that affect the individual personally
- social-altruistic - judging phenomenon based on the costs and/or benefits of a "human" group as a community, nation or state
- biospheric - judging the level of support given with reference to the costs and/or benefits to an ecosystem or biosphere (Stern, Dietz & Kalof, 1993; Schultz & Zelezny, 2003)
The values that are associated with *biophilia* and the SVT can also be interpreted in these categories. As illustrated in Figure 3, one end of the scale depicts two circles that simply lie side by side and do not interact at all. This could describe an individual as egoistic (Stern, Dietz & Kolof, 1993), valuing power and status (Schwartz, 1992) or dominionistic (Kellert, 1993). On the other end of the scale is a combined circle representing self and nature as an equal part of an individual’s existence. In this case, the relationship could be viewed as biospheric in nature (Stern, Dietz & Kolof, 1993), universalist (Schwartz, 1992) or humanistic (Kellert, 1993).

Figure 5.4: Inclusion of Nature in Self Scale (Schultz, 2002)

**Values**

Prior to discussion that delves into the role of values in issues of environmental concern, a working and applicable definition of value must be determined. The question of what values actually are and the roles they play in an individual’s life can vary greatly not only from discipline to discipline but within disciplines as well. Two similar, but straightforward definitions of value that are widely used are:
• important life goals and principles (Rokeach, 1973)
• standards which serve as guiding principles in a person's life (Schwartz, 1992)

For this study, values will be designated as "environmental values" as described by Schultz (2004) from the field of Environmental Psychology. He defined this classification of values as "those that are specifically related to nature or those that have been found to correlate with specific environmental attitudes or concerns".

Often used interchangeably and therefore sometimes hard to distinguish, subtle differences do exist between values and attitudes. As stated above, values are described as life goals and principles or standards. Attitudes, as described in a similar manner are:

• a person's evaluative judgement about a particular entity typically expressed in degrees of favorability (Eagley & Chaiken, 1993)

Environmental attitudes as described by Schultz (2008) are a "collection of beliefs, affect and behavioral intention a person holds regarding environmentally related activities or issues". Schwartz (1994 in Schultz, 2004) connects attitudes and values in such a way that identifies a value as an "organizing system of attitudes and beliefs" as well as "determinants of attitudes". When focusing on environmental concerns, the connection between values and attitudes can be proposed as environmental values have the power to direct environmental attitudes (possible actions with regard to a particular issue or concern that an individual holds true).
Values and Zoo Visitors

Many authors allege that education has become the focus of many zoos. Falk (2006) discusses that visitors, on the other hand, don't necessarily consider education to be their main reason for visiting. Education may manifest itself within the visit, but may not be a goal or central reason for the visit (Morgan & Hodgkinson, 1999). A recent body of research proposed that zoo visitors approach their experience with the expectation of creating and/or enhancing their relationship with the biological world (Fraser, Gruber & Condon, 2008). This idea establishes that there exists an interest among zoo visitors that their visit be more than just an entertaining day out with family and/or friends to view animals. They want to add value to their visit by experiencing an encounter with nature (Bruni, Fraser & Schultz, 2008). In support of this are results reported by Falk, Heimlich & Bronnenkant (2008) in a study on the impact of a visit to a zoo. There are several contributory findings that are strong in reference to both the Fraser et al (2008) study as well as the ideas behind biophilia and the other concepts discussed. A selection of these findings are found below:

- 61% of visitors found that their zoo experience supported and reinforced their values and attitudes towards conservation
- visits to zoos prompted many (54%) to reconsider their role in conservation action and to be part of the solution

Bruni, Fraser & Schultz (2008) conducted a separate study to examine connectedness to nature and values as a valid way to measure the adult zoo experience. The authors affirmed that expectations are becoming more complex -experiences can no longer be labeled as simply "satisfying". They suggest a variety of challenges researchers who
strive to measure connections between zoo visits face between connectedness with nature and environmental values. Traditional methods of surveying, interviewing and observing may not be accurately measuring what visitors take away from their experience - much of what they take away may not be directly observed or of conscious thought. Bruni, Fraser & Schultz (2008) used The Implicit Association Test (IAT) to measure implicit connections, which is designed to reveal unconscious associations between concepts and words and the reaction time necessary for response.

Another way to measure underlying ideals that may reveal connection to nature is to examine the level of value zoo visitors place on conservation concerns. A study recently published by Fraser & Sickler (2009) used scales to explore values of zoo visitors in six related areas. The topics that were of most interest to the study at hand are summarized in Table 5.1. One question that emerges from this research concerns the relationship between the level of value an individual places on a broad to narrow funnel of topics focusing on nature, animals and zoos and whether it may lend insight into this concept. See Figure 5.5 for an illustration of these instrument items.

| Environmental messaging | places to educate about animals and habitat
| is important in international conservation efforts to preserve species |
| Personal values | places to care about, appreciate and learn living animals |
| Connection with nature and animals | places to appreciate living animals
| to experience nature and living animals |
| Teaching, learning and skill development | to educate individuals about animals and habitat
| to help children learn about the natural world |

Table 5.1: Summary of value-based responses (Fraser & Sickler, 2009)

70
Research Questions

The main question guiding this research is:

• Do specific personal values of zoo visitors influence the viewing of conservation messages in videos present in zoo exhibits?

There are sub-questions that must be explored in order attempt to answer this question. They start on a very broad level regarding values and their connection to the environment and environmental issues focusing down to the specific issues ultimately desired.

Subquestions:

• Is there a correlation between values regarding zoos and animals to those regarding conservation issues?

• Is there a correlation between scores given to statements regarding zoos in the community, animals in nature and animals in captivity vs. the scores given to that which focuses on learning about conservation issues through video in a zoo exhibit?

METHODOLOGY

Research Site

This study was conducted at the Columbus Zoo & Aquarium in Columbus, Ohio - a large zoo located in the far northwestern section of Columbus proper, about 20 miles from the city center. Currently, the zoo owns approximately 578 acres with just under 100 acres developed for visitors. This institution is an internationally acclaimed conservation, educational and cultural organization, which serves over 1.5 million visitors per year, and also makes substantial contributions to the preservation of the world's wildlife and
habitats (B. Revard, Personal Communication, July, 2009). Because of the dedication to conservation action as well as educating its visitors, it was determined that this be an ideal site to conduct this study.

Participants

During the summer of 2009, data were collected from a total of 254 adult zoo visitors. This was accomplished by asking participants to fill out a survey using the continual ask method of sampling. Seven of the participants did not complete their surveys and were deemed unusable thus leaving N=247. Participants were adult zoo visitors approached by the researcher in three different locations in the zoo. Locations were chosen on each day of data collection based on crowd levels. Locations were also chosen to be void of the presence of video. It was assumed that if the participants were just exposed to the opportunity to watch a video or had actually done so, then their response to the fourth statement could have been inadvertently biased. The first location was the area outside the elephant yard during the baby elephant viewing hours. The second area was inside Asia Quest across from the Flying Foxes exhibit and the third location was just inside the entrance to the Manatee Building.

Instrument

For this study, four value-based inquiry statements were designed to reflect personal values with regard to four topics relating to the zoo, animals, animals in captivity and video as a source of relaying conservation messages. These topics were chosen to not only gain insight into visitor values related to the zoo, but also how the participant valued
animals in the natural world. They were designed to start with a broad sense of the level of value visitors placed on the zoo as part of their community and ended with a narrower focus of how the individual obtains the intended conservation messages. Figure 5.5 illustrates how the statements used in the instrument start broad and continue down to a narrow focus. Instructions were present at the top of each survey and instructed the participants to rate these statements individually on an 11-point Likert-type Scale based on their level of agreement with each.

RESULTS

Two sets of analyses were performed with the data collected. First, the mean scores and standard deviation were calculated in SPSS 17.0 for each statement to establish a basic level of agreement participants placed on each topic (See Table 5.2). Mean scores showed that participants placed similar value on each of the statements. The only statement that stood out as showing any sort of difference in value was the last statement concerning learning through video - but was still ranked in the upper middle of the scale. Standard deviation also did not show any significant change between statements. The second analysis run on this data set was a Pearson product moment correlation (Pearson's $r$). This was used to establish any correlation between scores from statements 1-3 against that of the fourth. Table 5.3 below contains the data from this analysis. Results from this analysis show that each factor is not only positively correlated with the target statement (#4) but with each other as well.
Figure 5.5: Value statements used in current study instrument

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean Score</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement #1</td>
<td>8.49</td>
<td>2.03</td>
</tr>
<tr>
<td>Statement #2</td>
<td>8.84</td>
<td>1.97</td>
</tr>
<tr>
<td>Statement #3</td>
<td>8.26</td>
<td>2.27</td>
</tr>
<tr>
<td>Statement #4</td>
<td>7.01</td>
<td>2.58</td>
</tr>
</tbody>
</table>

Table 5.2: Value-inquiry statement results (N=247)
Two sets of analysis were run on the data collected - mean scores and standard deviation were calculated as well as Pearson's r to establish any correlation between the first three statements to the fourth (the specific focus of the study). Mean scores showed that participants placed similar value on each statement ranging from 7.01 to 8.84 out of an 11-point scale where the results from the Pearson's r analysis revealed that each individual statement was not only positively correlated with the target statement but also with each other.

Results from data raised certain questions. If we look at the statements on an individual basis, Statement #2 received the highest mean score (8.84). This statement focused on the value an individual placed on animals as an important part of nature - sans any inference to zoos or zoo visits. This could be viewed as lending support to the notion of
biophilia and connectedness with nature previously discussed. The statement with the lowest mean score (7.01) was that of the main scope of the study itself - that learning and retention of information through video in exhibits. Even though the score itself was in the middle range of the scale, does this score in relation to the others mean simply that video is not recognized as a method of learning while viewing exhibits. It could also agree with some of the literature reviewed that education may be still be a primary goal of many zoos, but not that of the visitor (Falk, 2006; Morgan & Hodgkinson, 1999). Since correlation scores showed strong positive relationships, it could be assumed that even if a zoo visit influenced the value system of an individual, which has been suggested in the literature (Falk, 2008; Bruni, Fraser & Schultz, 2008), responses to these statements are not likely to change.

IMPLICATIONS

• Since the literature strongly suggested that much of what a visitor gains from a zoo visit is implicit, instruments such as the Implicit Association Test (Schultz, 2004), may be more effective in revealing useful data concerning video in zoo exhibits as a method of relaying conservation messages.

• Because of their ambiguous nature, value-based studies have a tendency to raise questions of validity and whether they actually have any sort of influence on behavior (Oyserman, Neil & Baltes, 2001). The challenge to researchers is to establish a firm base from specific fields of interest as to what a value is and the most effective means to measure them. To attempt to form relationships among
values from different scholarly fields creates a quagmire of results that is often difficult to substantiate.

**FUTURE STUDY**

- Does being in a zoo setting influence the level of value placed on the instrument statements? How would the results change if the same statements were asked of individuals in an entirely different location that did not relate to animals at all.
- In order to fully uncover the role that zoo exhibits play in relaying conservation messages to visitors, similar value-based inquiries should be applied to other methods of message communication in a zoo setting such as one-on-one staff/visitor interaction, exhibit graphics or take-home information.
- Which part of each value statement were visitors actually responding to - because each statement consisted of multiple parts, were visitors responding to the last sentence they read or were they responding to what stood out to them the most? In order to address this question, each statement would have to be deconstructed and put tested with zoo visitors again.

**DISCUSSION**

The main research question guiding this study was "Do specific personal values of zoo visitors influence the viewing of conservation messages in videos present in exhibits?"

Several minor research questions needed to be addressed in order to reach this main focus. Through the literature search, it was established that E.O. Wilson's *biophilia* hypothesis (1984) as well as Schultz's (2002) *connectedness to nature* do appear to be
related to personal value systems and as a result, environmental values systems as well. It was also recognized that zoo visitor expectations have expanded in recent years and now include references to the above theories in that visitors want to experience and connect (or reconnect) with nature (Fraser et al, 2008; Bruni et al, 2008). Even the mission of an empire such as Disney has recognized this need and incorporated it into the mission of Disney's Animal Kingdom, which states, in part "to create personal experiences for guests that celebrate wildlife, renew everyone's connections to the natural world and inspire conservation action" (Dierking, Adelman, Ogden, et al, 2004).

Along with the relationships noted above however, there were inconsistencies that presented themselves with further study and critique. On a broad level, Brown (1984) defines value as "an enduring conception of the preferable, which influences choice and action" (p 232). Recently, Schwartz (1992) defined values as those standards that serve as guiding principles in a person's life. Schultz (2004) then went one step further and defined environmental values as those "that are specifically related to nature or that have been found to correlate with specific attitudes or concerns" (p. 32). What is being described throughout these definitions is typically labeled as held values - usually defined as "modes of conduct, end-states or qualities which could possibly be desirable" (Brown, 1984, p 232). This was also the intention of the research as well - to produce "held" value responses from each participant. In the same article, Brown (1984) also introduced the term assigned value, which is defined as the expressed worth of one value in relation to another. He suggests however, that the relationship between these two terms actually spurs conflict in that when an individual indicates their belief in one held
value over another, it becomes an assigned value - thus an object of worth rather than a guiding principle. After review of the statements used in the instrument, it was identified that similar inconsistencies as described above were present - raising the concern of unconscious clarity to the participant. Were the statements clearly phrased for the individuals, how were they interpreted and what part of the statements were participants actually responding to? This will warrant further study in the deconstruction of the statements used in the instrument, re-administered and analyzed for comparison.

**CONCLUSION**

The general purpose of this study was to investigate a proposed connection between relaying conservation messages using video in zoo exhibits in relation to personal values.

This was accomplished first by establishing a basis from the literature that there is in fact, a strong association between values concerning human connectedness to nature, and the level individuals recognize in themselves as their connection to the natural world and thus, environmental concerns. This association was then put to use in determining the final purpose of connecting visitor environmental values with methods of relaying messages.

Analysis of the data in this research enabled a connection to be made between these concepts and the categorization of individuals based on the level of value they place on themselves in relation to their association with nature. If there is a strong association with nature, then a relation between the individual and how they value a zoo visit and
receive intended conservation messages can be explored. The results from this study support this strong correlation of statements.


Revard, B. Personal Communication, Columbus Zoo and Aquarium, July 2009.


APPENDIX A
Instrument for Phase #1

Thank you for taking the time to fill out our survey! As you were walking around the zoo today, you may have noticed videos in several of the exhibits. In making the decision to stop and watch the video, please indicate your preferences for each of the following characteristics. Each has two parts. First, please rate your response in order of importance (1 being least important and 7 being most important). For the next part, indicate your choice by circling the letter next to the statement that you agree with the most. Please mark only one answer per item.

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>Of least importance</th>
<th>Of most importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>The location of a video encourages me to stop and watch.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>I would prefer to watch a video…</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a near the entrance of exhibit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b near the animal viewing area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c near the exit of exhibit</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FORMAT</th>
<th>Of least importance</th>
<th>Of most importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>The format of a video (loop, schedule, etc) is important to me.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>I would prefer to view a video that…</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a is playing continuously</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b I start myself</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c is on a timed schedule</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SOUND</th>
<th>Of least importance</th>
<th>Of most importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would be more likely to stop and watch a video if it had an audio track.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>I would prefer speakers that were…</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a mounted within the video kiosk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b mounted outside the video kiosk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c embedded in headphones</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SETTING</th>
<th>Of least importance</th>
<th>Of most importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>The presentation and/or setting of the video is important to me.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>I would be more likely to stop and watch if the video was…</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a located in a theater</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b an individual, free-standing kiosk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c a unit that was mounted/embedded in a wall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d a unit hanging from the ceiling</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LENGTH OF VIDEO</th>
<th>Of least importance</th>
<th>Of most importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>The length of a video will impact my decision to watch.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>I would prefer a video to be…</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a no more than 1 minute long</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b no more than 3 minutes long</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c no more than 5 minutes long</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d over 5 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CONTENT OF VIDEO</strong></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>----------------------</td>
<td>---</td>
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</tr>
<tr>
<td>I would be more likely to watch a video if it contained information about conservation efforts.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would prefer conservation messages in a video to be…</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a present - with important information regarding conservation programs and efforts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b not present - I would rather watch a video that did not contain any obvious messages</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If a conservation message was present in a video, I would prefer it to be…</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a repeated throughout</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b stated at the beginning and end</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c stated at the beginning only</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d stated at the end only</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>EXHIBIT SIZE</strong></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>The size of the exhibit where the video is located is important to me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I would be prefer the size of the exhibit to be…</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a large</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b medium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c small</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<table>
<thead>
<tr>
<th><strong>EXHIBIT THEME</strong></th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>The grand theme of an exhibit (relevant to the species, habitat, country, era, etc.) would impact my decision to stop and watch a video.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I prefer exhibits that are…</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>a completely immersive - makes you feel like you are part of the exhibit</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>b partially immersive - some details and props are present but are not overwhelming</td>
<td></td>
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<tr>
<td>c not immersive at all - just give me the facts about what I'm looking at</td>
<td></td>
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<table>
<thead>
<tr>
<th><strong>SEATING</strong></th>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seating would have an impact on my decision to view a video.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would prefer…</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a no seating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b bench-style seating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c theater-style seating</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>CROWD LEVEL</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
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</tr>
<tr>
<td>Size of crowd watching the video is important to me.</td>
<td>a</td>
<td>just one or two people watching video</td>
<td>b</td>
<td>5-10 people watching the video</td>
<td>c</td>
<td>over 10 people watching the video</td>
<td></td>
</tr>
<tr>
<td>I would be more likely to stop and watch a video if there were...</td>
<td></td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>EXHIBIT APPEARANCE</th>
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<th>2</th>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>The overall appearance of an exhibit (presence of colors, signs, etc.) would impact my decision to stop and watch a video.</td>
<td>a</td>
<td>the presence of bright colors</td>
<td>b</td>
<td>presence of different shapes, patterns and textures</td>
<td>c</td>
<td>presence of labels and text panels</td>
<td></td>
</tr>
<tr>
<td>I would be more likely to stop at an exhibit with...</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>ANIMALS</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>The presence of animals in an exhibit would be an important factor to me in deciding whether to stop and watch a video.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would be more likely to stop and watch a video if...</td>
<td>a</td>
<td>no animals were on display within exhibit area</td>
<td>b</td>
<td>a single animal was on display within exhibit area</td>
<td>c</td>
<td>multiple animals were on display within exhibit area</td>
<td>d</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INTERACTIVE FEATURES</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactive features (such as quizzes, touch screens, etc.) would influence my decision to stop and watch a video.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would prefer to have...</td>
<td>a</td>
<td>interactive features present - such as on screen quizzes, touch screens</td>
<td>b</td>
<td>a straight, informative video</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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APPENDIX B
Instrument for Phase #2

Thank you for taking some time to participate in our research! Your participation is completely voluntary and anonymous. Below, you will find four statements. Please circle the number that corresponds to your level of agreement with each (1 being in least agreement with and 11 being in total agreement with).

1. The zoo is an important part of our community because it makes me aware of issues concerning species conservation. It is a reliable source of information regarding issues of this nature. I feel that I can trust this information because of the zoo's commitment to conservation and involvement in projects of this nature around the world.

2. I believe that animals are an important part of our natural world and society takes them for granted. I love animals and enjoy learning about them. The more I learn about them, the more I realize that there are certain species that need our help. There are lots of resources and organizations I can get valuable information from.

3. I think animals in zoo exhibits are important because this is the only opportunity many of us have to not only watch and experience them but develop any sort of appreciation for them and therefore learn about the threats against them. Seeing animals even in a replica of their natural environment and watching their behavior makes me feel connected to them and therefore inspires me to learn more about protecting them.

4. When I am at the zoo, I learn and retain information best by listening and watching the videos. Information regarding species conservation is most effective when I can see what is happening to the animal in its natural habitat and what role humans play (both good and bad). This makes more of a lasting impression than reading about issues in a magazine or newspaper.