JOURNAL OF THE INTERNATIONAL ZOO EDUCATORS ASSOCIATION – NUMBER 48 – 2012

journal

Can iPads Enhance Environmental Education?

Assessing Change in Conservation Attitudes in Zoo/Aquarium Education

Making Connections Between Exhibits and Conservation Actions at Home

How Teaching Methods Impact Conservation Education Programs Exhilarating Education on a Shoestring Budget

Can an Veterinary Exhibition Influence Visitors' Opinions?

Voices in Zoos & Aquariums

WAZA/IZE Survey to Understand Biodiversity Teaching

EXPANDING THE EDUCATIONAL IMPACT OF ZOOS AND AQUARIUMS WORLDWIDE

IZE President Kathy Lehnhardt Curator of Education Disney's Animal Kingdom

Can you think of an inspirational moment in your life? Inspiration often involves being touched emotionally by something or someone. For me, listening to a speaker like Jane Goodall is inspiring. She is a tiny, quiet woman but with unusually powerful, compelling words and amazing images of chimpanzees. Often, the next step after inspiration is a desire to take action and help in some way. This is what conservation educators are called upon to do every day... to inspire our visitors to take action for wildlife and wild places. Ultimately, this involves changing behavior to create advocates for positive change.



But what behaviors should we ask our visitors to adopt? There are so many! Our messages and actions must be directly on point. For instance, it is a good idea to have your pet spayed and neutered, but is this a message for zoos and aquariums to deliver? It is also a good idea to compost in your garden instead of adding to our landfills, but is this the best message for zoos and aquariums deliver? We must decide, within our facilities, which behaviors are directly tied to helping wildlife in your region and then train our staff to share these in every conversation with our visitors.

A recent article in the journal Conservation Biology, entitled *Conservation Means Behavior* states: "Results of research by behavioral scientists suggest that messages that focus on single, achievable, and specific actions are more likely to succeed. Broad pleas to "protect the environment" or "save the planet" are generally ineffective at changing specific behaviors (Costanzo et al. 1986). In addition, presenting people with long lists of behaviors to adopt is likely to be overwhelming and unlikely to be effective with any except the most ardent supporters. Furthermore, there is evidence to suggest that promoting positive behavior alternatives is more likely to induce change than attempts to curtail or prevent a certain behavior." This article goes on to state: "...results of psychological studies have shown consistently that increasing knowledge through education, whether related to health, safety, or conservation, does not lead to a change in behavior (McKenzie-Mohr et al. 2012). Instead, behavioral and social scientists argue that motivation is the driving force behind behavior change."

As educators, we know that knowledge alone won't change behavior. And the findings from McKenzie-Mohr et al (2012) support what we have found to be true – knowledge is easy to improve but improving attitude and changing behavior requires more than just facts. Conservation educators understand that a highly effective conservation education program should address and measure the audience's change in knowledge, attitudes and behaviors, not just knowledge. But it is unfortunate that scientists outside our discipline fail to understand that today's conservation educator develops programs that integrate information with inspirational activities and actions that learners can take to directly impact conservation.

So educators, this is our call to action. We must continue to work with our colleagues in other conservation disciplines to help them understand what effective conservation education entails. Only by working together and demonstrating the impact of conservation education will we be able to effectively address conservation challenges and save wild animals and wild places. Spread the word!

IZE President Elect

Rachel Lowry

Director Wildlife Conservation and Science Zoos Victoria

At the time of writing this, there are forty more sleeps until the IZE conference... not that I am counting! Each time I attend an IZE conference I return with a few extra tools in my toolkit, feeling inspired and reinvigorated.

Having had the pleasure of reviewing the journal articles submitted from all around the world for this year's publication, I'm particularly excited about the discussions that IZE will



facilitate this year. It seems that our commitment to influencing eco-literate communities is encouraging many zoo educators to explore new ways of evaluating shifts in attitudes, knowledge and behaviors. It also seems that many zoos have begun to explore ways to extend their reach through areas such as social media, which can only benefit wildlife and wild places if we manage to use these avenues effectively. This ultimately sums up the value of our journal and conference really doesn't it? Promoting new ideas and working collaboratively to increase our effectiveness as zoobased educators. A worthy endeavour which is why I have no doubt that I'm not the only member excited about heading to Chester Zoo in August.

This year's conference will be particularly exciting for me because I will take on the role as IZE president for the upcoming term. It will provide me with an opportunity to recognize Kathy Lehnhardt's great work over the past two years and gain a better understanding of how this incredible association can continue to work to serve the needs of our members.

Finally, in the spirit of building anticipation for the months ahead, I'm looking forward to meeting our 10 sponsored delegates and learning more from each of them about how conservation education is managing to generate gain for biodiversity throughout many of our world's biodiversity hotspots. This will be a fitting way to spend time with likeminded professionals in the UN Year of Cooperatives – a year dedicated to raising awareness of efforts that generate poverty reduction, employment generation and social integration, an aspiration behind much of the work that our delegates will share.

I thank you ahead of time for your contributions and support of IZE in the upcoming year and hope to see you at Chester Zoo in August (or through our new facebook page)!

ON THE COVER: Chester Zoo's Interactive Giraffe Experience

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Mission

educational impact of zoos and aquariums worldwide. Its mission is to improve the education programs in the facilities of its members and to provide access to the latest thinking, techniques and information in conservation education. The Journal is a medium for promoting the IZE mission and highlighting conservation education trends, initiatives efforts and achievements of IZE members.

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Submissions

The forthcoming IZE Journal will be published in August 2013.

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It's Time to Act Wild!

by **Rick Hammond** | Learning Technologies Officer Zoos Victoria | Australia

Can we affect real world behavior change through a digital project?

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Zoos Victoria has been using contemporary behavior change theories to shape our onsite visitor experiences for a number of years now. We have tailored some of the most proven and effective strategies for facilitating conservation action to a zoo context, which has led to the development of our Connect-Understand-Act model that now guides all our learning and visitor experiences onsite at Melbourne Zoo, Werribee Open Range Zoo, and Healesville Sanctuary.

But how does that translate into digital platforms where visitors are seen as "users" and may never physically visit our properties? Can we facilitate meaningful actions that are more than just liking and sharing a good cause? Can social media and web 2.0 tools be applied effectively to connect more people to our community conservation campaigns and to local conservation events?

It was with these questions in mind that we embarked on our Act Wild project in 2011. We were fortunate to secure a funding grant from The Department of Education and Early Childhood Development to develop an innovative web 2.0 learning resource for Victorian Schools. This gave us a solid budget and a clear direction. This project would be about conservation action and digital learning, thus ActWild.org.au was born.



Act Wild iPhone App Goes Wild! The Act Wild app is now live and free for anyone who has an iPhone or iPod Touch!

What is Act Wild?

Act Wild is an action-packed website and mobile app that helps people do little things that can make a big difference for wildlife. The focus is on animals and how our every day actions and consumer habitats impact wildlife both locally here and in countries far away.

There are 16 animal species featured and for each one there is a key action you can take that benefits the species in the wild. A number of these key actions link to our existing Community Conservation Campaigns such as Wash for Wildlife, Wipe for Wildlife, and They're Calling on You. There are also further actions to do if you found the first one easy and want to do more. The tone is positive and engaging without labouring too much on threatening processes, or using guilt to push users into doing something. Our philosophy is that taking action to help wildlife feels good and can become addictive!

Act Wild features exclusive images, videos, fun facts, a zookeeper blog, student forum, and an events calendar that enables a person to join local conservation events. Greening Australia is a key partner that has produced guides and videos on creating wildlife habitats for an individual's local area. All key functionality is accessible through the website or on mobile devices. iPhone and iPad users can also download our free Act Wild App which includes videos, fun facts, keeper blog feeds, plus additional features such as wildlife-friendly shopping tips, photo up-loader, zoo check-ins, and Ask a Zookeeper. Students can participate in web conferences with zoo experts, join forums, and get creative through conservation video mash-ups and other challenging projects.

Connect-Understand-Act Wild!

As zoo educators we know the importance of providing opportunities for our visitors to connect emotionally with our wildlife. We do this on site by providing opportunities to get up close to our wildlife, touch or feed an animal, and hear talks by our zoo experts. One of the best ways to create emotional connections between users and animals through digital platforms is with engaging videos. Each Act Wild animal has a 1-2 minute video about them presented by one of our keepers who work with that species. They share what they love about them, some surprising facts, what's threatening them, and what's the best way for us to help them.

Sharing stories from our keepers and other zoo experts is extended further with Zoo Feeds. This is where zoo staff members share unique stories about what we're doing in a short blog format. It's a great way to keep up with what's happening at our three zoos and learn about our conservation programs in the field. Users can read about critically endangered orange-bellied parrots breeding at Healesville Sanctuary as it happens, written by the threatened species keepers themselves. They can comment or ask questions too and share any zoo feed story to Facebook and Twitter. This fresh engaging content gives users a reason to return to the website or open the app.

Actions have been chosen that address the key threatening processes for each animal species. The actions have to be something that our users can do easily. As much as possible we've tried to facilitate the actions and remove any barriers. Any actions done are tracked and saved under the users profile and will appear on the home screen under "Latest Actions." The more actions users take the higher they will rank in our "Top Activists." This taps into our human need to show others what we're doing and also our underlying competitiveness.



We don't insist users register before taking action as that can be a major barrier to participation. They only need to register if they want to track their actions, tell others what they're doing, or post comments. If they've downloaded the mobile app any actions or other activity is tracked in their user profile when they register. They can still use the app without registering and share what they do through social media as well as the key actions Act Wild features local conservation-related events. Users can join events close to them such as planting days, wildlife surveys, and other hands-on projects.

Free to Use and Share

One of the cool features of Act Wild for other organizations or students is that all content is licensed under Creative Commons and can be used by anyone for education purposes. Other zoos or conservation organisations can even make use of our open data API (Application Programming Interface). This allows developers to use our content and functionality in their websites or other digital platforms.

So What Have We Learned so Far?

We're in the process of evaluating how Act Wild is achieving our aims so far. As of late March 2012 we're seeing over 3,000 unique website visitors per month and have had nearly 4,000 downloads of the mobile app. Act Wild has been featured in the Age's top free apps feature, and we have 40 zoo staff now contributing blog stories to Zoo Feeds. It seems to have engaged many animal-loving kids and adults alike and while it isn't perfect it does provide a great platform for us to grow community conservation in the digital world. Zoos Victoria is committed to fighting extinction and Act Wild gives visitors and users the opportunity to get involved to help save wildlife. Check it out at ActWild.org.au or look for the free Act Wild app in the app store.





Can iPads Enhance

Environmental Education?

by **Sean Coleman** | Learning Experiences Manager Melbourne Zoo | Australia



Imagine teaching a senior psychology unit in a classroom with a Bolivian squirrel monkey in an enclosure behind you, a huge Northwestern carpet python in an enclosure against one wall (and green tree frogs against the other), and a bearded dragon basking under a heat lamp in the center of the room. Now imagine senior students taking out their iPads to take photos and notes, while others capture images on their mobiles phones and input data into their netbooks. Finally, imagine wanting to illustrate Harry Harlow's experimentation on Rhesus monkeys, so you reach into your bag and bring out a laminated photocopied picture from a senior psychology textbook. In a room tightly packed with diverse fauna and students with technology, laminated pictures illustrate only one thing - dinosaurs are alive and well!

In an effort to improve the educational outcomes (and the very real scenario as outlined above) of the Learning Experiences teams at all three Zoos Victoria Properties, several iPads were purchased in order to trial their effectiveness across various methods of delivery. The Learning Experiences team at Melbourne Zoo received one iPad II as part of the trial. The basis of the trial was to ascertain if the iPad was a better engagement tool than the laminated photos, as currently used in multiple programs across all year levels.

Methodology

Accompanying teachers were handed a simple questionnaire at the start of a lesson, and asked to rate (from 1 to 5) several aspects of both the laminated photos and iPad, including clarity, visibility, relevance, connection, relevance of delivery method, and overall engagement. To ensure the results were not skewed or biased in any way, an equal number of photos were used in laminated and digital form. The only difference in numbers came from the addition of very short videos that were used sparingly by one or two educators in two programs only.

Clarity

88.9% of respondents found the iPad images very clear, compared to only 37% for the laminated images. The overall results of the iPad are exceptionally strong, whilst those for the laminated photos are very mixed, including 22.6% of respondents indicating the laminated photos were only somewhat clear.





Vision

The iPad achieved 92.6% for ease of vision (all students being able to view images), versus 44.4% for the laminated images. Once again, the results are very mixed for the laminated photos, yet the iPad received consistent results with only two respondents scoring less than 1: Yes, all.



Relevance

This question was included to ascertain if the accompanying teachers were themselves biased by the method of delivery. There was no difference in the relevance (educationally) of the pictures used in laminated or digital form. For example, during the Psychology program for VCE (last two years of high school) program, several images of rhesus monkeys used in Harlow's experiments were shown in both hard copy and digital forms. By including this question we were able to confirm that the images used were perceived to be more relevant (by accompanying teachers) when viewed on the iPad (i.e. a more relevant media).



Connection

In order to find if the iPad was a more effective engagement tool, finding the level of connection was important. Although the results are mixed for both media, 70.4% of respondents stated they felt "Yes, Very Connected" to the images on the iPad, versus only 25.9% for the laminated images.



Relevance of Delivery Method

This result was exactly as expected, with 92.6% of respondents stating that the iPad was very relevant and up to date, as opposed to only 37% for the laminated images. It was surprising that there were no results in the green column (indicating not relevant at all) for the laminated photos.



Engagement

This final question was, in many ways, the most important, as the Melbourne Zoo team were using the iPad as an engagement tool for students and teachers alike. As shown in appendix 6, 77.8% of respondents found the images on the iPad "Very Engaging", with only 22.2% of respondents scoring lower than 1 (the highest score). The results for the laminated images were far more varied, with 70.3% of respondents scoring the images lower than 1.



Results

Although the evaluation was limited in reach, a total of 27 surveys were completed by teachers from all class levels, and from a wide variety of schools (i.e. government, independent, Catholic, urban, rural). To illustrate the overall results an average for all questions was taken, focussing on the highest score only.

- *Laminated images:* A total of 37.75% of respondents scored each question at the highest level.
- *iPad images:* A total of 84.58% of respondents scored each question at the highest level.
- As shown above, the iPad is more than twice as effective as an engagement tool than the laminated photos.

Condusion

The most interesting of all results was that of Relevance, in that teachers perceived the same image to be far more relevant when viewed on an iPad. This is a fascinating result, and one that has surprised many, confirming the old adage of, "Perception is everything." With results so strong, all three Zoos Victoria Learning Experiences teams have recently ordered more iPads in order to continue delivering relevant and engaging content.

in Use

As the results of the study were overwhelmingly positive, more iPads were purchased for use by the Learning Experiences teams at Melbourne Zoo, Healesville Sanctuary and Werribee Open Range Zoo. It was always the intention to use the iPads to enhance the educator's delivery and ability to illustrate key points, not to replace verbal communication or the facilitation of discussion. Therefore, content was carefully chosen, and usage has expanded from simply illustrating still images, to showing small video clips, web pages and apps. For example, The Endangered Challenge, a 45-minute program for Middle Years students (10--13 years old), is delivered in both the Melbourne Zoo's Gorilla Rainforest precinct and the Jungle Hut learning space. Outdoors, the iPad is used to show a 33-second clip of Rigo, the gorilla (Gorilla gorilla gorilla) demonstrating dominant silverback behavior. Whilst Rigo may be only meters from the students, more often than not he is sleeping or feeding calmly. By using a short clip, students are able to see Rigo showing behaviors closely aligned with those observed in the wild.

Once inside the learning space, the educator shows several images (eq. coltan mining, poached wildlife) in order to facilitate a student centred discussion. Often the images are pushed (via an Apple TV and Airport Express ad hoc network) onto a wall mounted 50" LED television. The choice of showing the images to a small group in order to assist their argument in a class debate, or showing a much larger image to everyone, is a powerful one. Students are also shown apps (such as Act Wild) which may assist them in acting on behalf of the very animals they have been discussing. In using technology such as iPads, images can become far more engaging, and create exciting new ways to enhance the delivery of environmental education.

Leveraging the Power of Technology to Connect with Wildlife Using iPads

by **Colleen Tonkovic** | Education Coordinator Disney's Animal Kingdom® | USA

ites

The observations from the Melbourne Zoo's article "Can iPads Enhance Environmental Education?" paralleled our experiences at Disney's Animal Kingdom[®]. As educators, we know that families with children are always looking for fun and engaging ways to learn about wildlife. Visiting a zoo or aquarium, going for a nature walk, and camping have traditionally been popular activities for families. But today, children's attention is drawn indoors more dramatically than ever before through the use of video games, movies, social networking, the internet, and television. Technology is a prime form of entertainment in many households and it dominates children's time on a daily basis sometimes upwards of 7.5 hours a day¹. Studies have also shown that in a typical day, one in 10 (11%) 0- to 8-year-olds uses a smartphone, video iPod, iPad, or similar device to play games, watch videos, or use other apps. Those who do such activities spend an average of 43 minutes a day doing so.² But what if there was a way to combine a little fresh air and the popular world of technology?



Emily Young, Education Coordinator, lets a young guest select the best answer to the question of what a flamingo eats.

At Disney's Animal Kingdom[®], innovation and technology collide in a fun and interactive experience for our guests. The use of Apple iPads have become one of the most popular ways to connect our guests to the animals while also inspiring them to take positive action. As educators, we constantly look for new ways to raise our guests' curiosity and engage them. Recently, we started a new guest program and began thinking about incorporating unusual methods to convey messages. iPads were one suggestion. Although we were a bit sceptical around the use of technology, we decided to pilot their use and record guests' reaction to them. We wanted to reach a large number of guests at our Discovery Island section of Disney's Animal Kingdom[®], focusing largely on five species including flamingos, Asian small-clawed

otters, lemurs, lappet-faced vultures, and cotton-top tamarins.

Seeing wild animals up-close is an amazing experience in itself, and one that, on a daily basis, our guests may or may not experience. Children are amazed that a tiny cotton-top tamarin can leap almost 15 ft. (4.5 m), or that a lappet-faced vulture has a wingspan of 9 ft. (2.75m), but they may never see it during the few minutes they are in front of the exhibit. Through iPads, we can share those moments captured in photos or on video.



We wanted to find a way to increase our guests' knowledge of the animals by incorporating an interactive component. Using the Keynote app, Apple's version of Microsoft's PowerPoint, we designed interactive Species Stories as an activity for families with children of all ages. Each Species Story is staff-directed, conducted in front of the animal exhibit, and designed to last only about 5 minutes. They were developed for young guests; however, educators have found that they are easily adaptable for teens and adults. The stories contain natural history information about the animal including habitat, diet, physical and behavioural adaptations. We also include an image of a training session or enrichment item to highlight our mission of delivering excellence in animal care. And, of course, each story ends with a conservation action guests can take to help wildlife at home. To increase the dynamics of this short interaction, we also added animal vocalizations, where appropriate, into the story which surprises and delights our guests.

After each picture, guests are asked a question related to the topic, and using touch-technology, they are able to select one response from a choice of five. Once their answer is chosen, the correct response "twinkles". The Species Story incorporates a "hook, content, message" approach using a fun method that children and adults alike enjoy.





Was the iPad Test Successful?

Although we didn't conduct a qualitative evaluation, we were very excited to read Melbourne Zoo's assessment. Using a quantitative approach, we found that both guests and our educators are thrilled with the iPad experience. Our educators especially enjoy using this technology which shows off their skills and the capabilities of the iPad. One reason the educators enjoyed using iPads was that guests were attracted by the iPad and iPads were effective in holding guests' attention. So, truly they made the educator's job much easier in hooking guests into a conversation and engaging them through the conservation message. Here are a few comments by our guests and staff:

Disney Animal Kingdom[®] Guests

"It's nice to see zoos and conservationists use technology. It helps children want to learn, especially since some are out of touch with nature. They are more willing to learn using the iPad!" "My kids loved getting to pick which answer they thought was right! Very interactive." "Very hands-on and interactive. My kids really enjoyed it! "

Disney's Animal Kingdom Education Presenters

"The iPad bridges the gap between learning and technology for younger children." –Jay "It's a really great tool to use, especially when animals are not easy to see." –Taylor "I use the iPads a lot to help the younger children find the animals!" –Will "It's great for families who want to spend a little more time learning about the animals." –Arielle

With guests and educators enjoying the iPads, we have been reaching large numbers of guests. Since we began using iPads in February 2012, we have been reaching on average 35,000 guests monthly. This number has exceeded our expectations and we will consider using iPads in other animal exhibit areas to engage our guests.

In conclusion, technology can be an important tool for both longer, in-depth programs and for shorter exhibit interactions. As conservation educators, we can leverage the power of technology to connect with wildlife and to inspire conservation action in our guests. The motivation to learn about our amazing and beautiful wild animals in zoos and aquariums is enhanced by incorporating technology as an innovative teaching method. Go ahead and try it!



¹ Kaiser Family Foundation Report (www.kff.org.entmedia/mh012010pkg.cfm), January 20th, 2010.

² Zero to Eight: Children's Media Use in America

(www.commonsensemedia.org/research/zero-eight-childrens-media-use-america).

A Common Sense Media Research Study, October 25, 2011.

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Assessment of Change in Conservation Attitudes Through Zoo and Aquarium Education

by **Dr. Teresa Randall** | Director of Education **Oklahoma City Zoo** | USA

Introduction

Literature review revealed there was an apparent need for zoos to measure the impact that they have on their visitors. A 2008 study (Luebke and Grajal) reported that 64.9% of zoological parks occasionally, rarely, or never conduct visitor research and that the majority of data collected was either demographic information or related to visitor satisfaction. Noticeably there was a need for visitor studies that related directly to the zoos' mission performance such as affective reactions as well as cognitive gains. Five percent of zoo visitors in the United States are teenagers, and yet they are the most neglected age group with respect to zoo planning and programming studies (Wray-Lake et al., 2010). Likewise zoos had conducted little research that assessed the impacts of different teaching styles on visitors regarding cognitive or affective changes (Bell et al., 2009; Visscher et al., 2009).

The Oklahoma City Zoo serves as an informal setting for both free-choice and formal learning opportunities. A 2010 research study was conducted using teen visitors who engaged in either a field trip (termed "free-choice") or zoo education class (termed "formal learning experience"). Two research questions answered by this study were (1) did zoo education affect conservation attitudes and (2) did learning method (free-choice vs. formal) affect conservation attitudes?

Methods

A criterion-group design was used and participants were randomly selected using cluster sampling techniques. The population was visitors to the Oklahoma City Zoo and the sample were those visitors 14-18 years of age. Samples were further divided into two groups. Group One were teens who participated in a free-choice learning experience, defined as zoo interactions and experiences occurring within the confines of zoo grounds. Group Two were teens who participated in a formal learning experience, defined as exposure to a conservation education class taught by a zoo educator; and that occurred at the zoo or in the teacher's classroom.

The instrument used for this study was the conservation attitudes survey developed in part by funding from the Institute of Museum and Library Services Grant #LG-25-05-0102-0 and through funding for the Multi-Institutional Research Project (MIRP) from the National Science Foundation Grant #ESI-0205843. Affective response was assessed by asking teenage zoo visitors to respond to a series of 13 items on a survey (see attached survey). Teens indicated on a seven-point scale their level of agreement with statements that related to their attitudes towards 1) conservation 2) their ability to affect change and 3) the role played by zoos and aquariums in promoting conservation. Students circled a value from 1-7 with 1 = strongly disagree to 7 = strongly agree.

Retrospective pre/post test surveys were used to evaluate participant's perceived change due to program or field trip attendance. All students, regardless of zoo learning experience, completed the survey by reflecting on how they felt before their field trip or class and were also asked how they felt after their field trip or class. Before responses were considered their "pre" feelings and the after responses were considered their "post" feelings. By surveying retrospectively, the standard of assessing their perceived changes in attitudes would be consistent and therefore not subject to response shift bias (Davis, 2003).



A total of 534 surveys were distributed to students. Fifty-seven surveys were unusable due to missing and incomplete values. For statistical analysis, N=477 (with N=110 for the free-choice group and N=365 for the formal learning group).

Results

The sample was roughly equally comprised of males and females. Demographics revealed that a slight majority (50.7%) reported they had visited the zoo only once or twice and 73% had never taken a zoo education class previously. Data revealed that most students were either 15 years old (28.7%) or 16 years old (29.6%) and 48.4% were white and 6.7% left blank race responses.

Research question one asked "Did zoo education affect conservation attitudes?" Statistical analysis showed that a visit to the zoo did significantly and positively affect conservation attitudes of teen visitors to the Oklahoma City Zoo.

A paired t-test confirmed that conservation attitudes did positively and significantly increase as a result of some type of zoo education. Table One shows that the overall mean increased in a positive direction from 67.965 (retrospective) to 72.345 (present). Table Two shows the significance of the paired samples test.

Research question two asked "Did learning method (free-choice vs. formal) affect conservation attitudes?" Statistical analysis revealed that both instructional methods positively affected conservation attitudes and each group increased significantly. However, there was no significant difference between the formal or free-choice instructional methods in changing conservation attitudes among teen visitors to the zoo. A paired t-test assessed if learning methods affected conservation attitudes. The results shown in tables three and four indicate that both groups' conservation attitudes increased positively and significantly.

Discussion

Completing the instrument seemed to be difficult for the students. Surprisingly all 57 unusable surveys came from the formal learning group. Additionally all students from this group received a class on endangered species due to the large class size and lending itself to an auditorium style program. Other classes offered include zoo design and animal training. Would different class yield different results?

In informal learning environments students generally show increased attention, heightened curiosity and a willingness to observe, guestion and discuss phenomena more so than if they were in a classroom (Abraham-Silver, 2006). Informal venues capitalize on the use of discrepant events to pique visitors' curiosity. Discrepant events, both planned and unplanned, occur frequently at the zoo. Freechoice learners at the Oklahoma City Zoo have the opportunity to participate in daily events such as the sea lion show, riding the tram, zoo keeper facilitated animal feedings, docent touch and ask stations, reading and interacting with graphics and signage. Future zoo research studies should include questions in which free-choice learners were asked to indicate which discrepant events they encountered and participated in. This would allow for a more in-depth look at potential variables that may be associated with a change in conservation attitudes as a result of a free-choice experience at the zoo.

Free-choice learning happens when individuals have significant choice and control over their learning (Falk, 2005). Two arguments have been raised about free-choice learning. The first is that almost all free-choice learning involves some kind of facilitated instruction. Most free-choice learning experiences involve carefully crafted messages developed with specific educational goals or outcomes in mind. The second argument raised is how free-choice is free-choice learning? Many teachers leading field trips give students mandatory assignments. Since the assignments are preset by the teacher, and not the students themselves, is it truly free-choice? Future studies regarding zoo free-choice learning experiences could ask students if they had been assigned a formal task, such as a scavenger hunt or an animal observation, to do complete while on their field trip. This would allow for a more in-depth look at another potential free-choice experience variable.

Condusion

In the last decade, AZA institutions provided school field trips that connected more than 12 million students with the natural world (AZA, 2009). Research has shown that attitudes are not only shaped by cognitive factors but also through affective factors such as emotions or feelings (Ballantyne and Packer, 2005). Other research indicates that junior high and high school students exposed to environmental classes or programs demonstrated an increase in responsible environmental behavior and an increased awareness of environmental issues Likewise, Kellert (1985) reported that 8th to 11th grade students appear to be the most appropriate audience for fostering ethical and ecological appreciation of the natural world. In contrast, Newhouse (1991) stated that environmental attitudes are most likely formed as a result of life experiences rather than exposure to any specific course or program. Therefore, it appears that exposure to environmental education programs, whether formal or free-choice, for school age students is crucial.

The OKC Zoo study demonstrated that teenagers had significant positive affective change in conservation attitudes as a result of coming to the zoo. This may well be the first research that specifically addresses teens and the important topic of affective change. As a result this quantitative research can provide a foundation to inform, as well as craft, teen formal and free-choice zoo educational programs and experiences.

	Mean	Std. Dev.	Std. Error Mean
Retrospective (before feeling)	67.965	11.610	.0531
Present (after feeling)	72.345	11.092	.0506

Table 1: Retrospective vs. Present feelings paired samples means. Each respondent was asked to indicate their attitudes prior to their exposure to the field trip or class (retrospective response), followed by a response of attitudes presently held. Therefore, "Retrospective" refers to how a student felt before their field trip visit or class and "Present" describes how they felt after their field trip visit or class.

	t	df	Sig. (two- tailed)
Retrospective and Present	-11.730	476	p<0.001

Table 2: Paired samples test for significance Results yielded a probability <0.001 and was set at .05 therefore confirming that the change in conservation attitudes was significant.

Group	Answers	Ν	Mean	Std. Dev.
Free- Choice	Retro- spective	110	67.363	11.200
Learners	Present	110	71.563	11.895
Formal Learners	Retro- spective	365	68.147	11.771
	Present	365	72.581	10.845

Table 3: Free-choice learners vs. fo	formal learners group
means.	

Group	Answers	t	df	Sig. (two- tailed)
Free- Choice Learners	Retro- spective and present	-6.189	109	p<0.001
Formal Learners	Retro- spective and present	-9.999	364	p<0.001

Table 4: Paired samples test for significance. Results yielded a probability <0.001 and § was set at .05 therefore confirming that the change in conservation attitudes was significant.

Survey

The following questions were asked on the survey: Are you here on a field trip or a zoo class? Have you been to Oklahoma City Zoo before? Have you taken a zoo education class at Oklahoma City Zoo before? How old are you? Are you a male or female? What is your race? Are you of Hispanic, Latino, or Spanish origin?

	В	efor	e m	y vis	it				Н	ow	l fee	l no	w	
Strongly Disagree			Neutral			Strongly Agree		Strongly Disagree			Neutral			Strongly Agree
1	2	3	4	5	6	7	Being at the zoo is fun	1	2	3	4	5	6	7
1	2	3	4	5	6	7	I am part of the problems with nature	1	2	3	4	5	6	7
1	2	3	4	5	6	7	am part of the solutions to nature's problems		2	3	4	5	6	7
1	2	3	4	5	6	7	Zoos care about animals		2	3	4	5	6	7
1	2	3	4	5	6	7	Zoos are important for wildlife conservation		2	3	4	5	6	7
1	2	3	4	5	6	7	Animals are amazing	1	2	3	4	5	6	7
1	2	3	4	5	6	7	We need to help protect animals	1	2	3	4	5	6	7
1	2	3	4	5	6	7	We need to help protect plants	1	2	3	4	5	6	7
1	2	3	4	5	6	7	There is a lot I can do to conserve	1	2	3	4	5	6	7
1	2	3	4	5	6	7	There is not much I can do to help nature	1	2	3	4	5	6	7
1	2	3	4	5	6	7	Nature helps define America's natural heritage and character		2	3	4	5	6	7
1	2	3	4	5	6	7	Nature is a place to renew the human spirit	1	2	3	4	5	6	7
1	2	3	4	5	6	7	We have the responsibility to leave healthy ecosystems for our families and future generations		2	3	4	5	6	7

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EFERENCES

Using Targeted Education to Address Conservation Challenges: A Case Study in the Democratic Republic of Congo

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Successful conservation requires a multifaceted approach and the coordination of various organizations working together towards a common conservation goal. For example, our goal of preventing illegal ape poaching requires that authorities are equipped to confiscate apes and prosecute offenders, that sanctuaries have the resources to care for confiscated orphans, and that conservation education programs are established in areas with a high number of ape confiscations. Singly, these activities have little chance of deterring wildlife poaching; however when implemented together, the potential for promoting behavior change is greatly enhanced. Here we share our conservation education program that we implemented in the north eastern Democratic Republic of Congo (DRC) to help protect the vital great ape populations in this region. The program was developed in coordination with multiple stakeholders, including local leaders, educators, wildlife authorities, sanctuary staff and numerous local and international non-governmental organizations (NGOs). The program, which was the first of its kind in the area, was introduced in ten key communities in the Walikale and Lubutu regions of DRC. These areas were targeted because they contain critical ape habitats and also have increasingly high rates of ape confiscations.

Some of the largest areas of pristine rainforest in the eastern DRC are located in the Walikale and Lubutu territories. (see page 18 map). Although the forests are not formally protected by the government, the communities have designated the forests as protected areas and are working with the government to establish the land as formally



Orphaned Grauer's Gorilla at GRACE sanctuary in Tayna, Democratic Republic of Congo.

recognized community reserves. Walikale, located between Kahuzi-Biega and Maiko National Parks and Lubutu, located west of Maiko National Park, are both rich in biodiversity and currently have healthy populations of chimpanzees and Grauer's gorillas. Although human density inside the forests of Walikale and Lubutu are still quite low, the perimeters are some of the most densely populated and impoverished areas of DRC. This poses a major threat to these habitats since the outlying communities often come to rely on resources within the forests for survival. In addition to the rich biodiversity and pristine forests, Walikale and Lubutu contain valuable deposits of coltan, cassiterite, and diamonds; so mining is a major threat to the flora and fauna of this region.

Unfortunately, poverty, proximity to both wildlife habitats and a major roadway (there are very few roadways in eastern DRC) make Walikale and Lubutu prime sites for the illegal bushmeat and pet trades. Poachers hunt adult apes for bushmeat and attempt to sell surviving infants on the black market for large sums. For example, a Grauer's gorilla that was rescued by Virunga National Park Rangers in 2011 was being sold by poachers for \$40,000, which is approximately 200 times the average annual Congolese income. When orphans are confiscated, wildlife authorities arrange for care at one of the three facilities in north eastern DRC for rescued apes: GRACE (Gorilla Rehabilitation and Conservation Education Center) for Grauer's gorillas, Senkwekwe for mountain gorillas, and the Center for the Rehabilitation of Primates in Lwiro for chimpanzees. These sanctuaries are essential components to antipoaching efforts; however they are quickly exceeding their capacity due to a substantial increase in ape confiscations in recent years. Prior to 2000 only one eastern gorilla was confiscated by wildlife officials in the eastern DRC. In contrast, during the last ten years, 17 eastern gorillas and more than 50 chimpanzee orphans were confiscated from north eastern DRC alone. It is speculated that as many as 30 more chimpanzees came from this region but ended up in a sanctuary in southeast DRC (PASA, Personal Communication). Of those confiscated, a large number were from the Walikale and Lubutu territories. As can be seen in the map, ape confiscations were common



View of a protected forest in north eastern, DRC.

in villages located along the main road running between the two National Parks in the Walikale and Lubutu regions.

Developing a Strategy for Conservation of Great Apes in Eastern DRC

Due to the number of orphan apes coming from Walikale and Lubutu, local conservationists recognized action must be taken to curb the flow of apes out of this region. In early 2011, the Congolese Wildlife Authorities (ICCN) and the Jane Goodall Institute facilitated a Conservation Action Planning Workshop to assess the current status of chimpanzees and gorillas in northeastern DRC. An outcome of the workshop was the development of a Conservation Action Plan (CAP) for apes in eastern DRC, including threat assessments and identification of key conservation areas and strategies. During the CAP workshop, illegal

> poaching was identified as the number one threat to apes in north eastern DRC and the Walikale and Lubutu regions were recognized as critical target areas for conservation efforts. Furthermore, conservationists identified conservation education for local communities and law enforcement agencies as the priority strategy to protect gorillas and chimpanzees in Walikale, Lubutu and other areas with high rates of ape poaching.

Map of north eastern Democratic Republic of Congo. Red circles designate areas where ape confiscations have occurred. The Walikale and Lubutu territories include communities along the route between Lubutu and Itebero.



Needs Assessment

To help develop a conservation education strategy for ape protection in northeastern DRC, the Jane Goodall Institute-DRC conducted a formal needs assessment survey in the target areas of Walikale and Lubutu. The survey was conducted to determine the communities' knowledge, attitude, and practices with regards to great ape protection and to help identify important topics to include in conservation education initiatives. The results also established an important baseline measurement prior to the implementation of conservation efforts. The data demonstrated the importance of developing a program with a focus on wildlife penalties and bushmeat practices.



While 87% of all residents surveyed reported that they knew that it was illegal to buy a gorilla or chimpanzee, fewer than 40% were able to explain the penalties for killing great apes. Fifty percent of participants stated they were aware that great apes were being hunted or killed in their areas; most alarmingly, over 90% of the population admitted to eating bushmeat on a regular basis (see Table for bushmeat preferences). The sources of bushmeat varied with over 55% purchased from markets, 32% from personal hunting, and 12% purchased directly from hunters. Residents agreed overwhelmingly (96%) that education was needed to inform local people about wildlife laws and penalties and the importance of protecting wildlife.

Type of Bushmeat	Of Those Surveyed
Antelope, Monkeys	67%
Porcupine	21%
Elephants, Okapi, Leopard	9.5%

Conservation Education Strategy

To accomplish the goal of establishing a conservation education program for Walikale and Lubutu, Disney's Animal Kingdom[®] and the Jane Goodall Institute-DRC held the first ever conservation education workshop in Goma, DRC. Representatives from conservation organizations working in the area, district education officials, wildlife authorities, and representatives from sanctuaries and National Parks and Reserves came together to identify and agree upon the most important conservation messages for the region. This workshop marked the beginning of a conservation education movement in this region and the spirit of collaboration, shared goals, and feeling of empowerment forged many new alliances.



Pierrot Mbonzo from Lola ya Bonobo Sanctuary demonstrating the Web of Life activity to workshop participants.



Conservation Education Program Development and Implementation

Selection of Educators and Target Groups With this invaluable groundwork and critical information, the Jane Goodall Institute-DRC and Disney's Animal Kingdom® developed a conservation education program for the northeastern DRC which focused on the importance of keeping primates in their forest home. To establish our conservation education program, we selected ten key communities in the Walikale and Lubutu regions of DRC and chose nine educators from these regions to deliver the educational program. It was particularly important for us to involve local educators since this would enhance the capacity of local educators and ensure that educators were well-respected members of their community with first-hand knowledge of the conservation challenges of the region. We developed two educational programs: one that focused on adults and another designed for primary-aged children. The rationale for selecting these groups was based on the needs assessment survey data showing that the majority of adults believed that apes deserved to be protected (93%) and responded that they would participate in protecting chimpanzees and gorillas in their area (98%). Primary-aged children were selected since they are an ideal group with which to create a new value system and would help establish a new generation with a greater respect for apes and an increased understanding of the laws protecting apes and other wildlife.

Educator Training Workshops

Building on previous conservation education work in Uganda, the Jane Goodall Institute-DRC joined with scientists and educators from Disney's Animal Kingdom[®] to conduct a series of conservation education training workshops. During the workshop, local educators from the Walikale and Lubutu regions received extensive training on how to deliver eight different conservation lessons and were given opportunities to practice using the provided educational materials and props. The educators also participated in activities to help enhance their interpretive and leadership skills and learned how to conduct pre- and post- evaluations of the program. The lessons designed for the



Kavugho Mahamba, head of the women's group practicing the primate identification lesson.

to identify and learn about Congolese wildlife, a matching activity depicting what all animals need to survive, a puzzle to teach children how they can help protect wildlife, a cartoon story on the benefits of protecting natural resources, and a forest walk activity to connect children to nature. The adult activities included lessons on primate identification and suitable primate habitats, wildlife regulations and penalties, and a lesson on the importance of mother-infant relationships in apes. However, as literacy and formal education among adults in this region is guite low due to decades of war, many of the materials we developed for primary aged children, which were largely pictorial, were also applicable for use with adults. All of the teaching materials and the comprehensive instructor's manual were translated into French or Swahili, two of the local languages (English versions of some of the materials and training manuals are available for free download at www.izea.net). In addition to the formal lessons, billboards and posters about illegal bushmeat and pet trades, and regulations regarding apes were displayed in the targeted communities.

We are very pleased with the success of the program. In just 6 months (approximately 3 months focused on school programs and 3 months on community programs), the educators reached an incredible number of people in the Walikale and Lubutu regions. We are extremely encouraged by the dedication of the educators and the development of strong partnerships that has created a movement to help protect the wildlife and forests of north eastern DRC.

Key Accomplishments

- Implemented the conservation education program in 63 primary schools in the 10 target areas reaching 16,207 children.
- Conducted 60 community meetings reaching 1559 community members.
- Erected 10 educational billboards in 5 targeted locations and hundreds of posters, estimated to have reached more than 120,000 people living in or visiting the Walikale and Lubutu territories.
- Increased community awareness of wildlife laws and reporting of illegal activities to the Congolese Wildlife Authorities (ICCN). In 2011, 6 chimpanzees and 5 Grauer's gorillas were confiscated in the areas of Walikale and Lubutu, most of which were released to wildlife authorities voluntarily. One of the gorilla infants confiscated in 2011 was reported to wildlife authorities a couple of days following the community receiving the conservation education lessons.



(Above) An educational poster in Swahili developed by Fernando Turmo, Jane Goodall Institute-Congo-Brazzaville that explains why people should avoid eating, purchasing, or selling bushmeat and portrays a woman refusing to purchase bushmeat.

(To the Right) An educational poster in French developed by Fernando Turmo, Jane Goodall Institute-Congo-Brazzaville that explains the important motherinfant relationship in chimpanzees.

Key Learnings

- Thorough training of local educators is critical to the success of a conservation education program. At the beginning, educators were insecure and shy but following the training workshops, they were confident and energetic.
- Collaboration with other conservation NGOs and local leaders to implement joint conservation activities and promote consistent conservation messages is a successful strategy. We continue to combine efforts with our partners to be the most effective and efficient with our conservation efforts.
- Extreme poverty continues to be a major obstacle to behavior change in the Walikale and Lubutu regions. The consumption of bushmeat occurs out of necessity as a chicken costs around \$11 while a porcupine costs around \$3 and monkeys around \$8. Similarly, trees are cut because there is no alternative energy source.
- For our program, it was important to establish conservation actions that anyone could achieve and to include actions that did not require financial resources. However, as a result of the education programs, community members have requested livestock and tree nursery projects to help reduce their reliance on bushmeat and forest trees. To establish successful community development projects, we will work closely with our partner organizations to ensure that community members have the resources, skills, and training they need to implement such programs.





Adknowledgements



Many of the educational materials being used in this program were developed by Kathy Lehnhardt and her team of conservation educators at Disney's Animal Kingdom®. These same materials, with minor modification for cultural differences, have been used and evaluated in several African countries containing primates with great success. The posters and cartoon storyboards were developed by Fernando Turmo, Jane Goodall Institute-Congo-Brazzaville. Many of these materials can be downloaded from the IZEA website (http://www.izea.net/) at no charge. Thank you to the Jane Goodall Institute-DRC and Disney's Animals, Science, and Environment staff for their help in developing and implementing the program. This program would not be possible without our partners that support and contribute to the program: Congolese Wildlife Authority (ICCN), Union of Associations for Conservation of Gorillas and Development in the East Democratic Republic of Congo (UGADEC), North Kivu Ministry of Environment, North Kivu Ministry of Education, Inspection of Education for Walikale, Lubutu, and Goma, Kahuzi-Biega National Park, Maiko National Park, Arcus Foundation, Coopera, Conservation International, Disney's Animals, Science and Environment, Flora Fauna International, Frankfurt Zoological Society, Gorilla Organization, Jane Goodall Institute-Holland, Jane Goodall Institute-Spain, Jane Goodall Roots & Shoots, Wildlife Conservation Society, World Wildlife Fund, Zoological Society of London, Zoos Victoria, Center for the Rehabilitation of Primates in Lwiro, and Stella Matutina Hotel. Special thanks to Patricia Poaty, Jane Goodall Institute-Congo-Brazzaville for her amazing work training the educators and Omer Mbusa, UGADEC, for translating our workshops and materials. We would also like to congratulate the Jane Goodall Institute-DRC educators on their tremendous accomplishments and acknowledge their remarkable commitment to conservation: Kitima Anaclet, Adukako Amita, Barthelemy Tchangwi, Arajabu Kukay, Zaina Mboasu, Apolina Misingi, Abapolo Molisho, Samamba Misanda, and Mishonya Mirimo.



Tammie Bettinger and Alison Grand with participants of the Conservation Education Training Workshop in Goma, DRC.

Voices in Zoos and Aquariums

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Abstract

There are two voices at zoos and aquariums, that of the visitor and that of the park itself. Through capturing and analyzing the conversations of visitors to each other, their voices can be understood. Such content can reveal the extent these visitors hear and assimilate the voice of the park presented through a variety of media, particularly graphics, or interpret animals through their own experience and knowledge ignoring the park voice.

Visitors' Voices and Learning

The central importance of a social environment for learning has especially been emphasised by Vygotsky (1978). Effective teaching and learning is a two-way dialogue, between the teacher and the taught. Albeit on occasion the communication is second hand via the words of the teacher in a text book or other media. And yet at times, communication relies, strictly, on a social environment for learning. Therefore interactions at animal exhibits between peers, children and adults can enhance the growth of logical reasoning through a process of active cognitive reorganization that results from cognitive conflict. Recognition of information provided by the voice of the park could contribute to such dialogues and cognitive conflict and resolution.

The contribution made by the work of Vygotsky to our understanding of education that is most often mentioned is that each child is in a zone of proximal development (Vygotsky 1978). Scheersoi and Tunnicliffe (2009) conclude that the space around an animal exhibit is in fact the zone of experimental space, immediate to the focus of attention. This zone is the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers.

The importance of both, inter-family and peer communication is revealed when children's conversations are captured and analyzed (e.g. Borun et al., 1996, Tunnicliffe ,1996). Likewise the interactions between adults and learners in a zoo or aquarium have an equally social dimension as well as that of pedagogy. For example, analysis of visitor conversations (Clayton et al., 2009) reveals their understanding and interpretation of what they see and to exchange their ideas with peers and the teacher. In seeking meaning the visitors attempt to match what they see, which is unfamiliar, to something they already know in terms of the whole organism. In so doing, the learners employ metaphors drawn from their prior experiences. Such previous knowledge provides part of the interpretative framework that the pupils construct for themselves both individually and as a group. Thus visitors enter the zoo, such as museums, with their own narrative and with an entry agenda (Anderson et al., 2008).

However, there are two voices in zoos, there is also the voice of the zoo. This is first heard in their mission statement (Patrick et al., 2007). The voice is further heard in their exhibitory, the information provided for visitors through labels, interactive elements, and people's interaction with keepers and facilitators.

The Park's Voice and Learning

We reviewed the ways in which the zoos and aquariums make their voice available for visitors. Two small studies were conducted at European zoos (Jersey Zoo, Channel Islands and Opel-Zoo, Frankfurt) the first study outside a reptile house and the second in an aquarium.

Study 1: Park Visitors' Narratives

In the first study, the visitors were volunteer respondents invited to say what they thought about snakes. Fifty-three visitors agreed to respond. All but three were interviewed before entering the Reptile House. Their responses ranged across four domains from affective domain through the cognitive, to their own behavioural responses to snakes and a utilitarian view. Two interviewees had been in the Reptile House before, the others had not.

After a read process of the transcripts, which had been written, four super ordinate categories emerged. That of the Affective domains, of which some comments were positive about snakes and some were negative. Another but smaller group of comments was that of the Cognitive comments such as size, color, and physical attributes. Comments about the interviewees behaviour with regard to snakes emerged as another category, comments such as they held them or walked away from them came into this category. The smallest category was utilitarian comments regarding the use of snakes to humans in this culture, ranging from " useful to keep down mice" to " make nice handbags", a comment from two women.



Analysis by count of comments made about snakes before visiting the reptile House:

Affective Positive (ex. "like")	26
Affective Negative (ex. "hate")	24
Cognitive	15
Behavioral	16
Utilitarian	4

The Affective domain and Behavioral domain comments were often within the same responses. For example, a woman said, "*Snakes? I wouldn't go too close to them!*"

A young father with his child who was in a pushchair remarked, "Not their number one fan! To be honest. Don't mind looking but don't want to touch them unless I have to put on brave face for the little one."



One of the two post-visit interviewees after hearing the voice of the zoo through the interpretation in the Reptile House remarked "Now I've seen them I don't mind them, they're OK!" Two visitors before they went into the Reptile House but after hearing the voice of the zoo through a talk for visitors remarked, and both spontaneously commented at separate times:

Female (just been to snake talk): "*I think they're really sweet, nice little faces.*" Male (just been to snake talk): "*They're amazing.*"

The distance between the visitors and the snakes gave some confidence.

Female (just been in Reptile House): "*Huge, didn't think they got that big. Didn't move - I'd be out quickly but felt quite safe as they're behind glass.*"

There were few utilitarian comments. Two referred to fashion accessories using snakeskin, "*I don't like snakes, sorry. Nice handbags - only joking*". Anther woman remarked "*but they are important for the environment*". Yet another woman remarked "...useful, keep down the mice!"

Study 2: The Park's Voice Received through Text Labels

The second study observed leisure visitors to find out if they actually stop to read the existing text labels in an aquarium (participant observation; n=356). Information about the reading behavior was recorded onto a prepared sheet. A simple quantitative analysis of the data was undertaken. Additionally, spontaneous conversations about the animals presented were recorded (n=61) to identify information that is of interest to visitors. After transcription, the conversations were read and re-read to allow themes to emerge from the data using a content analysis approach (Dawson, 2009). The identified themes were then utilized to design and install new labels: instead of a continuous text, as it had been used on the labels before, the new texts were broken down into small chunks that started each with a question. The content of the questions was taken from the visitors' conversational data. Then a second visitor observation study was conducted (n=220) to find out if the new labels were more successful in attracting attention and increasing reading. Spontaneous conversations were recorded again (n=31) and additional structured interviews were conducted with some visitors (n=27) about their reading behaviour.

The conversational data show that visitors rarely refer to the information given by the zoo (texts) but interpret at the level of their existing biological knowledge, which is generally basic. Some examples:

Mother (observing a clownfish sitting in an anemone): "*The coral has caught the fish.*" Child: "*Why do they put such dangerous plants into the aquarium?*"

Woman (pointing at corals): "Look at the beautiful plants!"

Man: "*Piranhas are poisonous.*" Woman: "*Yes, and they even eat humans.*"

Piranhas - Piraten des Amazonas?

Woher hat der Rote Piranha seinen Namen? Er verdankt seinen Namen der Rotfärbung seiner Körperunterseite.





Wofür sind Piranhas bekannt?

Für ihr mächtiges Gebiss. Es ist größtenteils hinter den Lippen verborgen. Nur die Zahnspitzen sind sichtbar. Mit den messerscharfen Zähnen und ihrer kräftigen Kaumuskulatur können Piranhas Fleischstückchen aus anderen Fischen und Säugetieren herausreißen. Die Indianer im Amazonasgebiet benutzen die scharfen Kiefer als Scheren und Rasierklingen.

Sind Piranhas wirklich so gefährlich?

Es ist eher ein Mythos, dass Piranhas Menschen angreifen. Eigentlich sind Piranhas eher scheue Fische, die sich verstecken, wenn sich ein großes Lebewesen nähert. Kranke und verletzte Tiere hingegen greifen sie an. Da sie so verhindern, dass sich Krankheitserreger und Fischseuchen ausbreiten, bezeichnet man Piranhas auch als "Gesundheitspolizei".

Warum können Piranhas hier mit anderen Fischen zusammenleben? Die kleinen Rot-Blauen Kolumbianer in diesem Aquarium werden von den Piranhas nicht gefressen, da die Piranhas hier regelmäßig gefüttert werden und die Kolumbianer den Piranhas aus dem Weg gehen.

Man and Woman observing Piranhas and smaller fish (Blue-Red Columbian Tetra) swimming in the same aquarium:

Man: "*How can there be Piranhas and other fish in the same aquarium?*" Woman: "*Probably they are their babies?*"

Themes that are most discussed among visitors are the animals' common name, their interaction with humans or other animals, odd facts and behaviors, and where the animals can be found living in the wild. By using this information to create new text labels and respecting the formal criteria recommended (e.g. Bitgood, 2003), reading can be strongly enhanced: after the intervention, up to four times as many visitors read the new labels. The interview data revealed that there was much more reading because of the direct relevance of the information to the visitors and the increased ease of finding it. Visitor interviews confirmed that people are likely to be "put off" reading a sign that contains too much text. After hearing the voice of the zoo through the new text labels, visitors explained phenomena in a more biologically correct way. Examples of such more informed dialogue are shown in the following recorded conversations:

Child: "What is Nemo doing there?"

Mother: "Just read the text, then you will know." [Child reading the label] Child: "Ah, Nemo is protecting the anemone!" Mother: "Exactly. And what's the anemone doing?"

Child: "Protecting the fish as well."

Mother: "Look at the Piranhas – they have very strong teeth!" Child: "I cannot see them." Mother: "True, but you can see them here in the picture." [photo on text label]

Father repeating to his children the content of the text label: "*Piranhas have very sharp teeth. Indians use them as scissors.*'



These data and the simple analysis show that visitors entered the zoological parks with entry narratives, which persisted. However, seeing the animals, at a safe distance, encourages a more positive attitude whilst hearing the voice of the zoo had an impact on the emotions of the visitor regarding the order. Thus, if the zoo voice is heard, from whatever source, it appears that the narratives of visitors can be faceted into a more proactive attitude towards this order of animal. The challenge for zoos and aquariums is to have a voice that is received as well as being understood and for outreach activities to be listened to by visitors changing their everyday narrative.

Text labels can be very helpful in conveying the messages in the voice of the zoo or aquarium. Answering spontaneous questions voiced by visitors increases the attracting and holding power of labels. A survey can identify information that is of interest to visitors. It is important to researchers to bear in mind that it is not always what the staff think that does interest their visitors. Labels that present the zoo's voice in an appealing and accessible way can thus stimulate wonder, encourage interest development and the desire to know more, develop ideas and attitudes in a positive way and enrich their understanding of the natural world.

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Closing the Loop: Helping Visitors Make the Connection Between Inspiring Animal Exhibits and Conservation Action at Home

by Judy Mann | Director uShaka Sea World | South Africa

One of the challenges faced by an aquarium or zoological park is how to help visitors to connect the inspiring animal exhibits that they see with conservation messages, especially those about climate change and sustainable living. In order to address this challenge, uShaka Sea World currently has two completely different exhibits designed to inspire behavior change in visitors and have linked these to a national awareness campaign.

uShaka Sea World

uShaka Sea World is situated in Durban on the east coast of South Africa. It consists of a 5.7 million U. S. gallon (22,000 m³) salt water aquarium and dolphinarium. Visitors enter the aquarium through the iconic wrecked ship and after descending a ramp housing a genuine skeleton of a southern right whale, can stroll through five different galleries – themed as the remains of different wrecked vessels, gazing into six large and over 30 smaller exhibits. The Sea World bottlenose dolphins and Cape fur seals are presented to visitors during daily demonstrations, while a specially designed penguin rookery houses African penguins.

African Penguins

According to the 2010 IUCN Red Data List, the African penguin (*Spheniscus demersus*) is heading for extinction. African penguin numbers in the wild have declined by up to 90% over the last 100 years. The latest research indicates that there are less than 25,000 breeding pairs of penguins left in the wild. It is these facts that led to the species being declared as Endangered. Sea World has housed African penguins since 1980, when the first stranded birds were received. Since then the colony has grown and hundreds of penguins have hatched successfully. The program is now so successful that the birds are able to be sent to supplement the gene pools of other ex situ breeding colonies.



Three African penguins in the uShaka Sea World penguin exhibit.

Education through Inspiration

Around the world, aquariums are in a unique position to positively impact the environmental attitudes and behaviors of millions of visitors each year in an entertaining and enjoyable environment. At uShaka Sea World, our approach is to firstly create awareness through realistic live exhibits. We cannot expect visitors to care for animals that they do not know exist or to solve problems that they do not know about. This is a particular challenge in South Africa, where the word "aquarium" does not exist in any of our indigenous languages. Our live animals are ambassadors for the oceans – inspiring visitors to care. Our first step is to reach our visitors' hearts.

Once we have created awareness, we then need to connect visitors to the oceans. We try to help our visitors understand that everything in nature is connected and that we are connected to our environment. Our second step is to reach our visitors' minds.

So often the problem when teaching about aquatic environments is that visitors do not feel that they can make a difference – the ocean is too far removed from their daily lives. This is why it is essential that our interpretation has a call to action. This empowers visitors to take positive action. The third step, hopefully, reaches their hands – through their actions.

The African penguin is just one of the amazing animals at uShaka Sea World which inspire our visitors. uShaka Sea World has recently launched two bold new initiatives, both of which use the penguin as an icon to help our visitors to make the connection between the amazing animals they care for and their lifestyle at home.

Penguin Promises

The "Penguin Promises" campaign was hatched in 2011, in collaboration with the Animal Keepers Association of Africa (AKAA). Unlike many campaigns that ask for money, this collaborative campaign asks people to make a "Promise to the Penguins." With the tag line "We don't want your money honey, we want your love," this campaign encourages people to choose to make one change

in their daily lives to become more environmentally responsible. They are then asked to record their behavior change promise via a website, a postcard or e-mail. Their promise is their commitment to the environment. The campaign is multi-faceted and utilizes social media, with a dedicated website (www.penguinpromises.com) linked to Facebook and Twitter accounts as its primary communication tool. An annual "Penguin Waddle," along the 81 mile (130km) section of the coastline of South Africa which houses the most wild African penguin colonies, generates a great deal of media coverage and participants range from school children to animal keepers and rural community members. Participating organizations also regularly host special events to highlight the campaign.



The Penguin Promises Campaign logo.



uShaka Penguin Exhibit

uShaka Sea World has recently revamped their penguin enclosure and has highlighted the campaign through innovative signage and a wellplaced post box with specially designed postcards, which visitors can complete and post. The signage highlights the threats facing the penguins and gives visitors suggestions of promises that they can make. The rest of the exhibit includes a photo opportunity with life sized penguin models, a peak into the nesting area of the birds, as well as view of the working laboratory. The live birds are the highlight of the exhibit and with over 50 African penguins on exhibit there is always plenty of action – especially at feeding time.



The Penguin Promise post box with ideas of promises.

EcoHouse

In a bold new step uShaka Sea World has ventured beyond animal exhibits into the challenging realm of climate change – more specifically - what visitors can do about climate change. As visitors wander through the interactive "EcoHouse," an innovative new exhibit situated at the entrance to the aquarium, a friendly penguin invites visitors to explore easy ways to save money by reducing their energy and water use at home. From a full sized geyser and solar panel, to a quirky video of a woman talking from inside the fridge, interactive electricity panels, flushing toilets and flowing showers and much more – the exhibit attracts attention and challenges visitors to action.

Climate change can be a deadly boring topic - ocean acidification, sea level rise, warmer temperatures and food shortages – the topic abounds with doom and gloom. Unfortunately rather than galvanizing action, bad news stories tend to turn visitors off, feeling that the problem is so big that none of us can really make a difference. The EcoHouse addresses this serious problem in a more constructive and light hearted way. The penguin icon links human actions to penguins and gives visitors practical suggestions – using simple financial and ecological sense – which they can easily do at home. The connection to the "Penguin Promises" campaign is at the exit to the EcoHouse where visitors have an opportunity to make a promise to the larger than life penguin and commit to making one change in their daily lives to help reduce their carbon footprint. This photo opportunity is proving to be very popular, with a line often forming at the exit as people wait to make their promise and have their photo taken with the penguin.



The uShaka Sea World EcoHouse under the southern right whale skeleton at the entrance to the aquarium.

The Penguin Promises Campaign, together with the uShaka Sea World EcoHouse and Penguin Exhibit aim to inspire visitors, connect them to the animals and the challenges facing the oceans and then empower them to make a difference. Our overall goal is to help our visitors to return home inspired and motivated to help our environment.

Visitors post their promise to the enormous model

Evaluation

Both the Penguin Promises campaign and the uShaka Sea World Penguin and EcoHouse exhibits are being evaluated in order to determine their impact. The exhibit evaluations include baseline studies, pre- and post-visit interviews, guest observations and analysis of the "postcard" response system. The results will provide valuable information on how aquariums can use both animal centred exhibits and exhibits without live animals to optimize their impact on visitor behavior. The value of the social media component is also being assessed.

Condusion

Our environment is under greater pressure than ever before. We in the zoo and aquarium industry are privileged to experience the wonder of nature on a daily basis. We have a responsibility to share our love of the environment and to encourage and empower visitors to make the changes required to ensure that our environment is able to support us in the future. Our small steps in South Africa may not be the most innovative and they may not have the glamor possible with big budgets, but our animal keepers and our organizations care passionately about our environment, and together we, in one of the world's hotspots of biodiversity, will keep striving to make a difference.



Zoo Vets: Can an Exhibition Influence Visitors' Opinions?

by **Dr. Maggie Esson, Andrew Moss and Ruth Pearson** | Education **Chester Zoo** | United Kingdom

Abstract

To help zoo visitors appreciate the pro-active health care work of zoo vets, an exhibition was staged and received over 70,000 visitors. Research data were collected from visitors entering the zoo and those that had visited the exhibit. Independent t-tests were used in analysis and significant differences were found between the two visitor samples in a number of areas. Survey statements that related to the proactive elements of veterinary work showed the biggest differences in opinion.

Introduction

The veterinary care of zoo animals may be largely unseen by zoo visitors. It is however, an essential part of zoo life and as such deserving of inclusion in zoo education planning as part of the overall visitor experience. There may be a public misconception that the primary role of the zoo vet is to treat injured or sick animals and indeed the broadcast media often portray wildlife vets rather sensationally as trauma teams. The reality is that the work of the zoo vet team is primarily concerned with preventative treatments and the well-being of our animals, proactive rather than reactive health care. The vet team at Chester Zoo comprises: vets, vet nurses, an endocrinologist and technicians, a nutritionist and a guarantine manager. Their aim is to provide the highest standards of health and welfare for our zoo animals and we believe that this is an important message to convey to our zoo visitors.

The exhibition, *Zoo Vets* – *The Inside Story* was staged in Chester Zoo between March 2010 and January 2012 and received over 70,000 zoo visitors. The aim of the exhibition was for zoo visitors to understand that the work of the zoo vet team is primarily concerned with pro-active health care; as such the content of the exhibition covered the principle areas of veterinary work in this field. Following discussion with the vet team these were identified as: animal identification techniques, approaches to contraception, monitoring hormone levels, making regular parasite checks, quarantine arrangements and vaccinations for animal imports and exports. Additionally, information about diagnostic techniques and post-mortems was also part of the display.



Zoo Vets exhibition entrance

The *Zoo Vets* exhibition was staged in the Joseph Banks Room, a dedicated exhibit space of around 70 m² and located at a busy path intersection in the zoo. The content of the exhibition was designed in-house by a team comprising zoo educators and members of the vet team. The exhibition was planned to be a mixture of interactive elements interspersed with colorful information panels to ensure zoo visitors enjoyed a participatory learning experience (see Lindemann-Matthies and Kamer, 2006). This is in accordance with our Education

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Policy which defines our intention to achieve active rather than passive learning experiences. Interactive elements included a thermal imaging camera and display screen where visitors could see there own "hot spots." Information panels explained how vets use the thermal imaging technique as a diagnostic tool. A group of chimpanzee soft toys were fitted with microchips and a reader and there was a guiz to identify animals by their ID numbers. A sound board allowed visitors to listen to the differences in the heartbeats of animals including an Asiatic lion and a tiger rat snake. There were also simple photographic panels showing the complexities of giving animals pedicures and there was a short introductory film to the whole subject. The exhibit was always staffed by a zoo educator and this allowed for visitor interaction and encouragement to participate in the various activities. The exhibit content was in support of Chester Zoo's strategic objective of engaging the public with conservation science and as such we considered audience segmentation in the exhibit content and the age range of the materials produced was specifically aimed at teenagers and above (see Allen, 2004 for more detail on exhibition design). If visitors below this target age range entered the Zoo Vets exhibit, the educator on duty could simplify and adapt the content to make the information in the exhibit more accessible.



Interactive graphic at Zoo Vets exhibit.

Materials and Methods

This exhibition represented a major investment for the zoo and monitoring and evaluation was built into project planning from the beginning. Our aim was to compare the views of zoo visitors who had and had not visited the exhibition. We wanted to ascertain if those who had visited had significantly differing opinions from those who had not visited.

For those visitors who had visited the exhibition we wanted to ascertain if their opinions coalesced with the main themes of the exhibition. The decision was made to survey one cohort of visitors just inside the zoo entrance as they arrived, our control group, and another as they exited the exhibition, our experimental group. The survey was designed with a series of statements positioned on a 7-point Likert-type scale. As a preliminary step to designing survey content, a representative group of zoo staff from across all departments were invited to submit statements that represented their opinions on the role of the zoo vet team. Over 60 statements were received and these were organized according to common themes which were coded to create a survey instrument comprising 11 statements (see Miles and Huberman, 1994 for more detail on qualitative data reduction using coding).

Final statements for survey Giving animals an anaesthetic before operations Being on hand to help when an animal goes into labor Studying the animals to help us understand their needs better Carrying out post mortems on animals that have died Making sure the animals stay healthy by doing routine health checks Sharing vet knowledge with vets in other zoos Making sure plans are in place for possible disease outbreaks (e.g. "bird flu") Advising our zoo keepers on how best to look after their animals Treating animals that are sick or injured Putting sick animals to sleep as act of compassion Doing routine health checks when new animals arrive in the zoo

Table 1. Final list of statements for survey, categorized from consultation with a representative group of zoo staff.

The survey was designed to be completed by zoo visitors and personally handed out to visitors by a team of five education staff. This team participated in a data collection training session to ensure uniformity of approach. Visitors from both samples were selected with a "next available person" method. That is, the first visitor to cross an imaginary line (either in the zoo or exhibit) were approached and asked to participate. Once a survey had been completed, the next available visitor was chosen. Although this was not true random sampling, efforts were made to increase the representative nature of both samples, by collecting data at different times of day and also extending the collection period to account for seasonal fluctuations in zoo visitation (see Cohen et al., 2007 for a detailed discussion of sampling in social research). Although the survey was handed to one adult individual in each group, it was recognized from pervious experience that other members in the group were likely to participate. We see this as beneficial since responses are often negotiated and consensus within families evidenced in opinion forming. The survey was piloted with a small sample of zoo visitors and refined prior to beginning data collection.



Parasite examples in zoo vet exhibit.

Results

Over a period of nine months between August 2010 and April 2011 we surveyed 74 visitors in the zoo grounds and 88 visitors after visiting the Zoo Vets exhibition. Results were analysed using statistical software and independent t-tests were used to look for any differences between the two visitor groups. The mean rating and significance findings for each survey statement are presented in Table 2.

Statement	Visitors in	Visitors to
	Zoo Grounds	Zoo Vets
	Mean (n–74)	Mean (n-88)
Giving animals an	6 25	6 65*
anaesthetic before	0.25	0.05
Being on hand	5.72	5.39
to help when an		
animal goes into		
labor		
Studying the	5.42	6.16**
animals to help us		
needs better		
Carrying out post-	5.62	6 33**
mortems on animals	5.02	0.55
that have died		
Making sure animals	6.3	6.63*
stay healthy by		
doing routine		
health checks		
Sharing vet	5.78	6.24*
knowledge with		
Making sure plans	6.09	6.40
are in place for	0.09	0.40
possible disease		
outbreaks (e.g.		
"bird flu")		
Advising our zoo	5.85	6.51**
keepers on how		
best to look after		
their animais	6.04	6.05
Ireating animals	6.81	6.85
injured		
Putting sick animals	6.48	6.26
to sleep as an act of	5.10	0120
compassion		
Doing routine	6.23	6.6*
health checks when		
new animals arrive		
in the zoo		

Table 2. Mean ratings for each survey statement (7-point scale of agreement). Independent t-tests: *significant (p<0.05); **significant (p<0.01).



Animal pedicure equipment on display at the Zoo Vets exhibit at Chester Zoo.

Discussion

Results show that visitors to the exhibit perceived the work of zoo vets differently from visitors to the zoo who had not visited the exhibit, particularly with regard to the proactive elements of vet work, which the exhibit highlighted. The results from several of the survey statements showed significant differences between the opinions of the two visitor groups. For example, the statements: "Carrying out post-mortems on animals that have died"; "Advising our zoo keepers on how best to look after their animals" and "Studying the animals to help us understand their needs better" covered some of the less obvious aspects of the zoo vet's work - aspects that the exhibition covered in detail. Statements such as 'treating animals that are sick or injured' were rated consistently highly by both visitor groups. We believe that this is a reassuring finding as the exhibition did not cover this 'reactive' aspect of vet work to any great extent so a similar result from both visitor groups was to be expected. We found that the statements that related to the preventative

elements of veterinary work in zoos; for example, carrying out post-mortems and advising our zoo keepers showed the biggest differences. However, we do have to be cautious not to over-interpret these data because, by its nature, the 'exhibition sample' of visitors was self-selected; that is, we could only survey those visitors who chose to visit the exhibition. These visitors may well have represented an entirely different and distinct population of zoo visitors when compared to the general zoo visitation.



Demonstration of the microchip activity, part of the Zoo Vets exhibit at Chester Zoo.

Condusion

The aim of the exhibition was to focus strongly on the preventative elements and the findings from this research provide us with a validation of the exhibit. In an ideal research landscape a larger sample size for both visitor groups would have provided us with greater confidence in the findings. Visitor-centered research of this nature in zoos is time consuming and we are always aware of the intrusive nature of asking visitors to participate in zoo research. For this reason we are always conservative in our research planning. We do feel that these data support the claim that the Zoo Vets - The Inside Story exhibition has been successful in promoting the overall aim of the project. We run a rolling program of exhibits in the Joseph Banks Room and elements of the Zoo Vets exhibition are being reused as a careers' information exhibit in our schools' picnic lodge in the zoo. Additionally, the exhibition has been redesigned as web content on our education pages for schools.

One hidden benefit is that the educators that worked alongside the vet team to plan this exhibition gained valuable insights into the working practices of the vets and this constitutes continuous professional development for our educators.

Adknowledgements

We would like to thank members of the zoo vet team in particular Steve Unwin and Alison Kelsall for their enthusiasm and for finding the time to help plan this exhibition.

All six members of the zoo presenter team (Ruth Pearson, Sarah Bazley, Liz Marrs, Carrie Littlehales, Marisa Edward and Mathew Foster) participated in data collection and we would like to acknowledge how valuable this support was in being able to carry out this research.



Model "James the Vet" with James the veterinarian.

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Exhilarating Education on a Shoestring Budget

by Louise Matschke | Curriculum Specialist Johannesburg Zoo | South Africa

ities'

Being part of a zoo or aquarium education department in a diverse developing "big city" is not so easy particularly when you have a minimal budget. Through developing partnerships, one can partially overcome restrictive resources; be it financial, material or human. This article aims to illustrate how the Johannesburg Zoo has benefitted from such partnerships.

The Johannesburg Zoo is situated in the more affluent suburbs of the City of Johannesburg, a city that is home to over 3.8 million people (that are legal) in a province servicing over 22% of South Africa's population (Office of the Executive Mayor, 2011). It is home to some of the richest people in our country and also the poorest. As the economic capital of our country, if not our continent, it is home to a multitude of nationalities, both local and international but has received one of the lowest assessments for basic literacy, mathematical skills and science literacy and has 11 official languages. The Zoo is an entity of the City of Johannesburg from which it gets most of its funding but the city is committed to social upliftment.



The Johannesburg Zoo has teamed up with Johannesburg City Parks and Rand Water's Water Wise Education Team to promote educational experiences for youth of all ages.

What does this mean for the Zoo and in particular the education department? The first thing is diversity; diversity in age, race, language, economic stability and literacy levels. It means that we have to cater for a diverse group of people, from those who own mansions to people who don't having running water and proper sanitation. We get learners from "A" level education to adults who can't read; children attending elite private schools to those who don't have a classroom but a shack next to the city dump.



Life sized foosball in the park.

Another challenge is budget. The City of Johannesburg is committed to poverty alleviation and community upliftment which means the Zoo's basic operational budget is covered but the rest we have to source elsewhere. This is our biggest challenge as the annual budget for the education department is a little over R50,000 (US \$6,500). This budget needs to cover resource development, craft supplies, youth club t-shirts, taxidermy costs, display materials and other educational resources for all our formal and informal education programs.

So bearing all this in mind, how do we do what we do in and out of the Zoo? The answer is through partnerships.

Last year we developed a curriculum-linked program for Grade 11 learners on animal diversity which includes a section on classification of animal phyla. The program was an instant hit but that was thanks to the "cool" animal resources we loaned from a local university or received from uShaka Marine World. We would not have been able to successfully facilitate this program without an example of a starfish, leech or the "super cool" tape worm. Through the partnership with the University of the Witwatersrand we were able to keep these resources for months whilst the schools were visiting us. And as this is a mutually beneficial symbiotic relationship, the university also benefits as we offer our expertise as guest lecturers for specific courses.



Water quality testing projects thanks to our partnership with Rand Water.

Another amazing part of this partnership is that the university offers a subject called "Form and Function" of which the course assignment is to mount a skeleton of an animal. As partners, the students get carcasses from the Zoo for this project and in return the zoo gets a mounted skeleton. During this year we received a tortoise and a crocodile skeleton at no cost.



Educational puppet shows are also a part of this project.

Three years ago we embarked on a partnership with Johannesburg City Parks (JCP) and Rand Water's Water Wise Education Team (WWET). The main aim was to launch a school water monitoring and auditing project. At the Zoo we don't have any water monitoring or testing equipment but Rand Water, the company that purifies water in our province, has all the necessary equipment. The project also required us to visit schools regularly which was impossible for us as we only have five education staff but it is part of JCP's mandate to do school visits. As the Zoo we offered the participating schools free entrance to the Zoo for the project launch as well as the prize-giving. Both days included water monitoring and biodiversity activities facilitated by all the partners. This project is now in its third year and we have reached over 900 learners from the poorest areas in city and done 48 waterbody clean-ups across the city.

From the above partnership, all three stakeholders have assisted others in a variety of other programs (e.g. the Zoo and Rand Water ran activities at an event day for JCP. JCP facilitates plant classification as part of the Grade 11 diversity program mentioned above.)



One of the most beneficial partnerships that we entered into was with the National Department of Education and in particular the subject advisors (i.e.subject matter specialists). The Zoo offered these officials a venue to hold their quarterly meetings on condition that we could present our school programs to them. This small gesture flourished into a province wide workshop on animal diversity for the officials; then for the Grade 11 Life Science teachers and finally into a constant flow of Grade 11 students. Why this is so great is that it costs almost nothing for both parties, the teachers are able to facilitate an 8-week lesson into a 4-hour zoo trip. Learners are gaining scientific literacy and the Zoo benefits from income from their visits.



One of the most long standing partnerships is with the Rand Water Education Team as we have been working together for the past eight years. This team offers a wide range of activities for both formal and informal learning from puppet shows to water purification experiments. Best of all they come with an experienced educator to facilitate the programs. They have brought their puppet show for pre-school programs as well as for our junior holiday program. The team has attended almost every biodiversity special event that we have hosted over years, from Arbor Day to Water Week dealing with pre-schoolers to adults such as our own staff. Manzi, their costume character, is a firm favorite on our event days, getting the learners and staff dancing along to their water wise song. During the Soccer World Cup in 2010, the WWET came with a life-sized "foosball" game which was played by all; we even had a staff soccer competition with a lesson on being water wise.



Anything is possible when you team up with the right partners.

What we have learned is that, the way to deal with diversity (and a small budget) is through diversity. Having a diverse range of programs, events or services with the assistance of a diverse selection of mutually beneficial partners, anything is possible!

Office of the Executive Mayor of the City of Johannesburg. October, 2011. Joburg 2040: Growth and Development Strategy.

A Survey to Understand Biodiversity Teaching in WAZA Zoos and Aquariums

by Laura Penn and Gerald Dick | Administration World Association of Zoos and Aquariums | Switzerland

and by **Kathy Lehnhardt** | Curator of Education **Disney's Animal Kingdom** | USA

The World Association of Zoos and Aquariums (WAZA) and the International Zoo Educators Association (IZE) developed a survey to better understand whether and to what extent institutions are using biodiversity-related educational materials. Why? WAZA has pledged to be a partner with the UN's new Decade of Biodiversity program. This ten-year commitment promises to make great strides in the conservation of species and ecosystems as well as to build awareness in the general public about conservation issues and actions. Throughout the Decade of Biodiversity, governments and nongovernmental organizations are encouraged to develop, implement, evaluate, and communicate the results of positive impacts on raising public awareness about, and action for, biodiversity. As zoo and aquarium educators, we know that each day counts. The actions taken by individuals, stakeholders, and governments are important steps, one building on the other, towards protecting the life support systems that not only ensure human well-being, but support the rich variety of life on this planet. The Decade coincides with and supports the implementation of the Strategic Plan for Biodiversity 2011-2020 adopted by the Convention of Biological Diversity (CBD) at its tenth meeting held in Nagoya, Japan on October 2010. Based on the CBDs recommendation, the United Nations General Assembly declared 2011 – 2020 the UN-Decade of Biodiversity.

But where are we now in 2011 and where do we hope to be in 2020? To better answer these questions, Gerald Dick, Executive Director of WAZA, requested a baseline survey of WAZA institutions that are currently involved in biodiversity education. Many IZE members may remember committing to another Decade of Biodiversity from 2000-2010. We all had positive intentions and made great plans but unfortunately did not make the strides hoped for.

This new Decade is incorporating evaluation strategies to ensure documentation and data to support our efforts and demonstrate positive impact. A small sample of WAZA/IZE educators was asked to participate in this survey to gather a sampling of responses. This is not intended to be a comprehensive list of all zoo and aquarium institutions. The following are the results of the survey.

I. Who is creating materials?

Institutions involved in producing biodiversityrelated educational materials N=48 (institutions named)

The results reflect a broad distribution across the regions. The geographic distribution of institutions named is as follows:

- North America (14 institutions named)
- Europe (10)
- Asia (10)
- Central and South America (8)
- Africa (5)

Within North America, the institutions of the Wildlife Conservation Society (Bronx, Central Park, Queens and Prospect Park Zoos, and the NY Aquarium) have the greatest representation. Within Europe, institutions associated with Frankfurt are the majority. In Asia, institutions in Japan and India have significant representation. In Central and South America, institutions in Brazil are well represented and in Africa, South African institutions lead the way.

II. What blodiversity materials currently exist?

Available biodiversity-related educational materials N=28

The five biodiversity-related educational materials most found are:

- Activities such as games and puzzles (79%*)
- Posters, natural history objects, and photos (71% each)
- Videos (61%)
- Workbooks and brochures (57% each)
- Science equipment (43%)

* Response percent out of the total number of responses

The five educational materials least found are:

- iPad wildlife programs (7%)
- Music/songs and masks (14% each)
- Computer wildlife programs (18%)
- Scripts for dramas (25%)
- Costumes (32%)

III. Where are the materials?

The location of biodiversity-related educational materials N=22

The majority (50% of responses) of the institutions in the survey hold hardcopies of their educational materials in their education departments.

A further 23% of responding institutions have their materials available online.

14% have their educational materials available both as hardcopies and online.

14% deliver their educational materials only after participants have completed special workshops or training.

IV. What do institutions want?

Educational materials wish list N=30

The five biodiversity-related educational materials most wished for are:

- Videos (60%)
- iPad wildlife programs (53%)
- Activities such as games and puzzles (40%)
- Computer wildlife programs (40%)
- Photos (33%)

The five biodiversity-related education materials least wished for are:

- Data collection sheets (10%)
- Table displays (10%)
- Brochures (13%)
- Workbooks (17%)

V. What are the most pressing issues?

Gaps in zoo/aquarium biodiversity education N=28

79% of respondents felt that there were gaps in zoo/aquarium biodiversity education that were pressing and urgent to fill.

Of the 28 respondents, 18 provided descriptions of the needs. The three most frequently mentioned were:

- The need to evaluate and monitor different programs (4 responses)
- The need for financial and physical resources to implement programs (2 responses)
- The need for more networking between zoos (2 responses)

Other needs worth considering were:

- The need for a centralized collection of materials such as lesson plans, photos, and videos
- Resources to help define the term "biodiversity"
- The opportunity to use technology more effectively
- High-quality videos between 10-15 minutes long, detailing biodiversity-related issues

VI. What partnerships exist?

Partnership reference list N=17

For a full list of partnerships included in the survey, visit the IZE website.

VII. What evaluations exist?

Prevalence of evaluations, their content, and location N=22

46% of respondents had evaluated their partnership conservation programs.

Of the respondents who had answered in the affirmative, 9 provided details of what had been measured:

- Number of participants (89%)
- Change in knowledge (67%)
- Change in attitudes (56%)
- Number of conservation actions presented in program (44%)

VIII. What institutions have produced materials for conservation projects?

Knowledge of other biodiversity-related educational materials and contact details N=25

56% of respondents were aware of other zoos/ aquariums that had produced educational materials.

The education materials most produced were (N = 12):

- Brochures (67%)
- Posters (58%)
- Workbooks and photos (42% each)
- Data collection sheets and books/field guides (17% each)

IX. Additional comments and ideas

N=4

Respondents suggested:

- Marketing and benchmarking educational programs
- Fundraising and/or making programs selfsufficient
- Creating a cadre of zoo educators and volunteers
- Addressing sustainability issues in zoos and aquariums
- Establishing more links within the zoo and aquarium community

XI. Discussion: Who, What, Where and How?

The survey suggests that there is a broad range of activity surrounding the use and production of biodiversity-related educational materials. All of the geographic regions appear to be involved, most notably, North America, Europe, and Asia. Of the educational materials in use, the most prevalent seem to be activities such as games and puzzles. Posters, natural history objects, and photographs also appear to be widely used. All of these materials are the staples of any zoo/ aquarium education department. They are frequently used to educate, engage, and inspire their audiences.

Survey participants reported that the least used materials are iPad wildlife programs and materials related to the performing arts such as costumes, scripts, and music. Both of these categories are expensive and highly specialized, demanding software expertise and financial and physical resources, which may be difficult to come by.

The majority of survey participants indicate that their biodiversity-related educational materials are available onsite as hardcopies. Very few institutions appear to be using technology to share and distribute resources online, which is surprising in this day and age.

Survey respondents suggest that videos and iPad wildlife programs are the two biggest items on their wish lists. As there is no shortage of natural history documentaries and educational videos available for purchase, it is interesting to see videos listed as the top-ranking item among institutions. Further research should examine what types of videos institutions are referring to. Furthermore, the broad interest in iPad wildlife programs demands attention.

The least wished for items by survey participants, were data collection sheets and table displays, materials that most zoo/aquarium education departments are likely to already have, as they represent the tried and true staples of environmental education.

The majority of survey participants believed that

there were gaps in zoo and aquarium biodiversity education that were pressing and urgent. Of the respondents who gave insights into what these were, several suggested that there should be more evaluation and monitoring of educational programs. Others felt that there was a basic lack of financial and physical resources available to implement programs. A handful of survey participants also believed that there should be more networking between zoos and aquariums. Some participants suggested practical solutions to needs, such as designing educational resources to help define the term "biodiversity." One of the most useful suggestions was the idea to develop a centralized collection of educational materials such as lesson plans, photos, and videos.

Partnerships, Evaluations, and Other Resources The current survey found that there was a considerable selection of partnerships across the world, reflecting an active and engaged community of educators and conservation professionals.

Furthermore, the current survey revealed that a considerable number of institutions had performed evaluations on their educational programs, however, the quality and extent of the evaluations was difficult to determine based on the results. Further research should examine these elements in more depth.

Finally, survey participants provided a useful list of other institutions involved in producing biodiversity-related educational materials. This list may be helpful in the future.

For more information and lists of responses, find the entire survey posted on the IZE website. It is important to note that currently the IZE website has a sizeable collection of education materials and events and is already acting as a centralized collection site for conservation education materials. To add to the richness of these materials, please share yours by sending them to the IZE Central Office at: ize.centraloffice@izea.net

This needs assessment on biodiversity education provides essential data that builds the evaluation process and may help secure funding for future efforts of the Decade of Biodiversity. Internships for Students of Secondary School of Information Science and Services at Dvur Králové Zoo

by **Tomáš Hajnyš** | Education Dvůr Králové Zoo | Czech Republic

Over the 2009-2010 school year, Dvůr Králové Zoo educators developed an internship for students of the Tourism course at the High School of Information Science and Services. The activities were managed by Tomáš Hajnyš, educator at the zoo, the teacher Stanislava Karbanova, and her thirty students. Every other Tuesday from 14 September 2009 to 22 June the students attended zoo classes and completed activities. They were split in two groups between 8 a.m. - 2 p.m.

The main aim of the internship for the students was to gain basic experience as guides and to become familiar with the operation of a zoological park in order to present the zoo as an important tourist site of Hradec Kralove Region in their future work within the industry.

The Darwin Centre, the zoo's education facility, became base camp for the students. Here they met and learned about the live animals used in educational programs and they discovered how conservation educators use natural history objects such as taxidermy specimens, skeletons, skins, skulls, and eggs to enhance the effectiveness of their programs. Thanks to support from the Euroregion Glacensis' project called "Zoo as a School," the Darwin Centre offers a range of teaching methods using multimedia presentations and video records.

In addition to learning about the history of the zoo, animal houses and animal habitats, the students practiced their communication skills with visitors and the operation of audio and video equipment. Teaching methods that were demonstrated throughout the year included the use of hands-on objects and working on projects both independently and in small groups. While on the zoo grounds, students studied a wide variety of species and then expanded their presentation skills by sharing their new knowledge with the class. To visualize their progress, Zdenek Cermak recorded each students' presentations using a camcorder, both at the beginning of the internship when students were talking about animals for the first time, and then again during their final exam so that students could clearly see their progress. This way each student was able to see themselves on a large screen and study how best to improve. The feedback was provided by teachers as well as other students.

During the internship, the students realized that an accomplished tour guide needs to be extremely knowledgeable about the zoo, its operations, and all the animals. Resources used in the internship included the current Zoo Guide and Animals of East Bohemian Zoological Garden Dvůr Králové nad Labem, a book written by Monika Petrikova-Ptackova. Regular homework assignments focused on researching a specific group of animals, observing a professional presentation, completing animal worksheets and developing a classroom presentation of their own or in groups. At the beginning of each session, students took a short test to demonstrate their skill level. The internship was made more attractive through the inclusion of a field-training lesson guided by Slavka Dvorakova, a student in the Faculty of Natural Sciences at Charles University, Prague. Although this meant a large time commitment by the zoo educator, each of the internship sessions was taught twice for each group.

Course Syllabus

Session I

Registration, safety at the zoo, necessary items shoes, clothes, pen, camera, binoculars

Animal observations in groups of zebras, buffalos, giraffes, antelopes and rhinos. Presentation of group results.

Introduction to the Darwin Centre, the animals and the general objective of the internship.

Hoofed mammals and birds - observation of the animals in large outdoor enclosures and in the safari park using binoculars

Presentation: history of Dvůr Králové Zoo Homework - write a research paper about the

directors of Dvůr Králové Zoo.

Session II

Scavenger hunt - an introduction to the animal facilities and orienteering around the zoo Evaluation of the activity. The African Savannah - presentation, observing elephants, completing worksheets Working groups - browsing/grazing animals, predators, scavengers African Savannah and giraffes worksheets & evaluation

Working groups: hyraxes - common traits with elephants, mammoths, skull, leg and elephant tusks, elephant poaching

Behind the scenes tour (rhinos, giraffes)

Homework - research primates (gorilla, chimpanzee, orangutan)

Session III

Small animal test

Primates - presentation and quiz

Movie: mountain gorillas in Congo and research on chimpanzees in zoos

Behind the scenes tour - primate house

Worksheets on primates

Homework - research carnivores (felines, viverrids,

canines, hyenas and bears)

Session IV

Test on animal information - primates Analysing chimp, gorilla and orangutan traits, evaluation of the worksheets on primates Presentation on carnivores - felines, canines, hyenas and viverrids Studying carnivores at the Darwin Centre Team work - felines, canines, hyenas and viverrids Movie - Felines, canines Homework - Research giraffes

Session V

Test on animal information Presentation - giraffes Behind the scenes tour - Reticulated giraffes Hands-on session - giraffes, natural products Worksheets on giraffes and evaluation Primates - presentation and quiz Homework - research on odd-toed ungulates (rhinos, zebras)

Session VI

Test on animal information - carnivores Analyzing feline, canine and hyena traits, evaluation of the worksheet on carnivores Presentation: odd-toed ungulates Returning black rhinos to Mkomazi movie, presentation - zebras & donkeys Hands-on session - rhinos and zebras at the Darwin Centre Team work - rhinos, Grevy's zebra, mountain zebra, plains zebra Movie - zebras, the Savanna Worksheets on rhinos Homework – research the Proboscidea and even-toed ungulates (bovines, goats, sheep and camels)

Behind the scenes tour - zebras

Session VII

Test on animal information - rhinos

- Analysing rhinos (black/white/Indian) and zebras (Grevy's/Hartmann's/plain)
- Evaluation of the rhino worksheet
- Presentation: elephants Proboscidea, even-toed ungulates save antelopes (bovines, goats, sheep and camels)
- Skin and bones of the elephant at the Darwin's Centre
- Team work African and Indian elephant, bovines, goats, sheep and camels
- Movie elephants
- Elephant worksheets & homework: complete the sheet and research reptiles and birds
- Out of scenes tour the male elephant facility at the African Savannah house

Session VIII

- Test on animal information elephants Analyzing the African and Indian elephant, bovines, goats, sheep and camels, evaluation of the elephant worksheet Presentation by guest speaker - field training in ethology Teamwork using worksheets - behavioral observations of mammals, birds and reptiles
- Movie Reptiles, Birds
- Worksheets birds, reptiles
- Homework: complete the sheet and learn about antelopes; learning the narration for
- Evening Safari rides
- Behind the scenes tour Bird World & Water Worlds

Session IX

- Test on animal information reptiles and birds Homework: evaluation of the worksheets, reptiles and birds Presentation: antelopes - bushbucks, bonteboks, wildebeests, true antelopes, impalas, oryxes, reedbucks and waterbucks Observation of hoofed mammals in seasonal
- enclosures and in the safari park Rehearsal for guided tours, students assigned specific species, (classic zoo, seasonal
 - enclosures, safari park) on the basis of the narration for the Evening Safari

A safari park ride

<u>Session X</u>

Final evaluation of the guides, students assigned specific species (classic zoo, seasonal enclosures, safari park) Grading of the performance. Evaluation of the work done throughout the year Farewell

Each of the students excelled at their guiding duty at each of the animal areas and performed at a high level. At the end of the internship, each student passed their final exam and was graded accordingly. By September and October, the students were actually guiding African Safaris at the zoo. Some of the more accomplished students stated that they might wish to become professional zoo guides in the future. With such accomplishments in the first year, we added another internship in 2011-2012 for more advanced students of the Secondary School of Information.

This internship proved to be a success for all involved including the students, the instructor and my facility, the Dvur Králové Zoo I would recommend this type of internship to any zoo or aquarium looking to advance conservation education and increase trained staff for summer employment.

Environmental Education Programs: Can Their Effectiveness be Influenced by the Teaching Method of the Visiting School? by Heidi Kilian | Formal Education Manager

uShaka Sea World | South Africa

Abstract

Environmental education programs aim to increase knowledge, create awareness and encourage positive attitudes towards the environment. But what is the best teaching method to enable this to happen? The Natel's Portland Cement Sea World Education Centre conducted a study to look at two conventional school system methods to see which one would work best at enhancing learners' environmental knowledge and creating more positive attitudes.

Introduction

The NPC Sea World Education Centre is visited by thousands of children who participate in our educational programs. These children come from diverse backgrounds, and yet our aim is the same for each and every one-foster a love for the ocean and to promote conservation in the hope that they will increase their knowledge and possibly change their attitudes towards the marine environment.

The role of an environmental education program in an aquarium is to improve understanding of the human relationship with the non-human world, plus to foster a positive attitude towards the marine environment by creating an awareness of marine animals and their natural habitats (Kruse & Card, 2004:34). Zoos and aquaria have the opportunity to teach through hands-on experience and therefore encourage participation. This may establish perceptions that could form the basis for future attitudes (Kruse & Card, 2004:34). Habitats and species cannot be valued if they are not known about, or the damaging practices affecting particular species cannot be altered if those practices are not perceived as a threat (Evans, 1997:239). The lack of awareness creates a challenge as many people seldom visit

aguaria, but when they do, it is vital that a lasting impression is made on them. To achieve this, environmental education programs need to choose an effective teaching method that will enhance knowledge and encourage attitudes and behavior that are environmentally responsible with a view towards conservation of natural resources and the protection of diversity of life in a variety of habitats.

Presently within the South African school system, two main teaching strategies are employed: Teacher-centered instruction and Learner-centered instruction. Teacher-centered instruction focuses on the teacher presenting key concepts of the subject matter in the form of a lecture. Learner-centered instruction focuses on the teacher organizing the learners into groups and then providing them with resource material. This strategy spreads the responsibility for learning between the teacher and the learners (McCown et al, 1996:393.). A learner-centered approach is also consistent with a constructive view of learning (McCown et al, 1996:405.), with learning best done in real life environments, where concepts and ideas should be learned in diverse ways.



Touching live animal used in method 2's lesson.

At uShaka Sea World, both of the above mentioned methods are used in our environmental education programs. A study was conducted to investigate the effect of the two teaching strategies and associated teaching methods used in uShaka Sea World's educational programs. The aim of the study was to compare the methods of the "traditional" lecture-style method (where learners are passive) with cooperative learning, to determine the influence of each on learners' knowledge retention, attitude and behavior towards marine conservation.

Methods

Sample selection focused on the target population from the eThekwini Municipal area in Durban, and a simple random sampling technique was used to select the schools from the Sea World's Natal Portland Cement (NPC) Outreach Program. The area was divided into five regions: a central area, a northern area, a southern area, an inland area and a coastal area (see Figure 1).



Figure 1 - Sample selection area within the greater Durban area.

One school from each area was chosen, and each of the five schools had an average of 120 Grade 7 learners, who ranged from 10 to 15 years of age. These learners were from similar socio-economic backgrounds. Data was collected over five days with each school being brought in on a different day. The selected sample of 120 learners from each school was divided randomly into two groups. Each group received a pre-lesson questionnaire in English, which covered specific environmental topics relating to the lesson to be given. This gave an indication of the baseline knowledge of the learners, as well as an assessment of their prior attitudes and behaviors.

The questionnaire was completed in the presence of a Sea World Educator. Each learner responded individually, although the questions were read aloud to guide learners. This was designed to eliminate the possible problem of poor reading abilities.

The questionnaire had four sections:

- Section A focused on determining the demographics of the group;
- Section B consisted of 10 multiple choice questions that determined knowledge;
- Section C contained 10 statements rated on a 5 point Likert scale to determine attitude change;
- Section D consisted of two open-ended questions to determine the learners' perceptions about environmental problems

Each group received a lesson on marine conservation, with Group A being exposed to a teaching-centered strategy using the lecture style method. Group B was exposed to learner-centered strategy participating in co-operative learning. At the end of the lesson a post-test questionnaire was given.

Three months after their visit to the Education Centre, the learners were re-visited and given a delayed-lesson questionnaire. This follow-up would provide an indication of long term knowledge retention of the topic, as well as the long term effects of the lesson in terms of attitude change.

Results

Knowledge Acquisition:

The pre-test values show no significant differences, indicating that all learners had a similar knowledge base when they started the program. The posttest scores show a significant difference, which indicates that there was a significant difference between method one and method two when comparing the post-test knowledge scores, and that method one may be a more effective method than method two for the overall group. There was no significant difference between the two methods for the delayed test for the total group, indicating that neither method was more effective than the other over a longer period (see figure 2).

Overall, method one had a higher mean than method two. Similar results were found when comparing post-test scores for schools 1, 2, 3 and 5. This indicated that, overall, method one was a more successful method for knowledge retention in the short term. There was no significant difference between the two methods for the delayed test for the total group and for schools 1, 2, 3 and 5. However, school 4 showed a significant difference in favor of method two when comparing the means for the two methods for the post-test and delayed test results. This may suggest that the learners from school 4 gained more knowledge in both the short-term and long-term periods when participating in an interactive lesson as compared to a lecture style lesson. This may be due to the fact that out of the five schools, school 4 is the only school that practises cooperative learning on a consistent basis in the classroom. It is also possible that as learners are taught using this method, they are more familiar with it and therefore this may allow for greater knowledge retention.

Changing Attitudes:

As with knowledge retention, the pre-test values show no significant attitude differences, which is to be expected as this indicates that all learners were of a similar attitude base when they started the programme. The post-test scores showed no significant difference (p=0.051) for the total group, which indicates that neither method was more effective than the other in creating attitude change for the short-term period. However, the results indicate that method one does promote a positive change in environmental attitudes in the long-term (after a three month period) as the delayed test scores showed a significant difference between the two methods for the total group (see figure 3).





When comparing the post-test attitude scores for each school individually, there was also no significant difference between method one and method two. This could mean that it does not matter which method is used, as neither is superior in changing attitudes in the short-term period. However, the results indicate that method one does promote a positive change in environmental attitudes in the long-term (after a 3 month period) as the delayed test scores showed a significant difference between the two methods for the total group, favouring method one over method two in creating more positive environmental attitudes. This trend was also shown individually by schools 1 and 3. Schools 2, 4 and 5 showed no significant difference between the two methods for the delayed test.

Generally, therefore, method one showed more evidence that it promoted a positive change in environmental attitudes both for the short-term and long-term period.

Discussion

When a comparison was made between the two methods to ascertain which method may be more effective for short-term knowledge retention, method one showed an overall significant difference compared with method two. This may imply that method one enhanced knowledge retention over the short-term period (before and after the lesson). However, method one showed no long-term (three months later) significant difference compared with method two. This could suggest that neither method is more successful than the other regarding long-term knowledge retention. When comparing the two methods within each individual school, school 4 showed that method two was more effective in both short and long-term knowledge retention when compared with method one.

As far as attitude is concerned, when a comparison was made between the two methods, to ascertain which method may be more effective towards changing environmental attitudes, both method one and method two were equal in creating attitude change for the short-term period. However, method one showed an overall significant difference in the long-term period compared with method two. It could therefore be deduced that either method could be used to influence environmental attitudes in the shortterm period, but to create a long lasting effect in attitudes towards the environment, method one may be the more successful.

Condusion

As seen from this study those learners from schools 1, 2, 3 and 5 who participated in method one's lesson appeared to achieve better results, having a greater increase in knowledge retention and attitude change, compared to the learners from the same schools who participated in method two's lesson. The learners from school 4, who participated in the method two lesson, showed a greater increase for both knowledge retention and attitude change compared to learners from the same school who participated in method one.

ELS.

When learners are presented with an unfamiliar teaching method, this may influence their perceptions and understanding (Ormrod, 1990:192). Learners therefore need to be able to connect with the concepts and methods presented to them. Anderson (1995:202) suggests how the material is studied impacts on how much of that material is retained. In this study the educators from each school indicated that schools 1, 2, 3 and 5 use the same methods of teaching as method one (lecture method) while the teaching method used in school 4 resembles more closely that of method two. This may therefore indicate that in order to acquire knowledge and a positive change in environmental attitudes one needs to consider the teaching method that learners are familiar with and that is used in the classroom.

So, yes, it can be suggested that effectiveness of an environmental education program may be influenced by the teaching method normally used in the visiting school and the key conclusions drawn from this study for implementing a successful environmental education program would be to determine which method of teaching (method one or method two) is practiced in the classroom of the visiting school, and then ensure that the same method is used when offering the program. It is also important, when designing the program, to relate any new information to existing concepts with which the learners may be familiar. Marine species are often foreign to learners who visit the NPC Sea World Education Centre, so when designing a program for these learners it would be important to link or relate new information to knowledge or species with which the learners are familiar.



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"Primates Like Us" - An Interactive Exhibition to Enrich Conservation Education

by **Dr. Annette Scheersoi and Professor Paul W. Dierkes** | Bioscience Education **Goethe University Frankfurt** | Germany

Introduction

Half of all primate species are endangered. The goal of our conservation education program is to help visitors realize that primates, as our closest relatives, are not just "monkeys" but very diverse and fascinating animals, and to raise awareness about the importance of conserving their habitats.

Materials and Methods

Studies have shown that zoo visitors often do not read information text labels. We therefore chose a different approach to convey our messages: An interactive exhibition was set up within the ape house Borgori-Forest at Frankfurt Zoo, next to the enclosures (fig.1). Thus, the observation of the living animals was combined with the visitors' active exploration of different themes like primate diversity/systematics, nutrition and feeding, distribution and conservation biology.

To catch and hold the zoo visitors' interest, educational efforts are more effective if the visitors' interests are engaged and developed. The exhibit followed these educational principles:



Figure 1: Side by side: Ape observation and interactive primate exhibition.

Multimedia/Hands-On approach: A variety of media were employed to attract a wide range of visitors with different preferences (e.g. an interactive computer game with touch-screen (fig.2), portrait photographs of different primate species, sorting and quiz games, models and other visualisation aids such as an interactive map of the world to show the distribution of different primate species and the loss of their habitats (fig. 3).



Figure 2: Primate classification game.



Figure 3: Interactive world map



Real life connections: Daily life experiences were used as entry points into the exhibition's themes. Starting from everyday phenomena, similarities and differences between *Homo sapiens* and the other primates were shown in order to connect the biological information with the individual visitor's existing knowledge, thus making it meaningful and relevant. An example is shown in figure 4, the "Gorilla Cracker" – this was an installation to compare the bite force of gorillas and humans. Furthermore, a sofa with a "family portrait gallery" at the exhibition's entrance designed to remind visitors of a living room (fig. 5).





Figure 4: "Gorilla Cracker"

Organization of knowledge: The amount of text was reduced to a minimum. The given text information was carefully structured and presented in a "multi-level-form" (each level successively provides more details and additional information) to help the visitors detect and understand the messages. Instead of presenting isolated facts, opportunities were given to incorporate the information into a larger picture. General principles were introduced and explained, for example, dentition or digestive tracts adapted for different types of food.



Figure 5: Sofa with "family portraits"

Evaluation study on interest development: An evaluation study was conducted to examine the effectiveness of our educational approach. Questionnaires and visitor observation were used (ex. visitors stopping, watching behaviours) and their conversations were observed and recorded. As our theoretical framework we chose the Person-Object-Theory of Interest by Krapp (1999) and Schiefele (1991) (see Tunnicliffe & Scheersoi 2009 for a short summary). According to this theory, emotional engagement, the perceived value of the information presented and feelings of competence (meeting optimal challenges) are important factors that influence the development of interest. In general, interest development starts with catching a person's attention. This first step, "triggered situational interest" (Linnenbrinck-Garcia et al., 2010), is similar to the conceptualization of "catch" (e.g. Mitchell, 1993). It reflects the positive affective reaction visitors have towards the presentation of an object - in this case the exhibition. The second step, "maintained situational interest", which is also referred to as "hold", is a more involved, deeper form of interest in which the person begins to establish a meaningful connection with the object/domain content. Once the first phase of triggered situational interest has been elicited, it may provide a basis for a person to begin forming a connection to content. In the second phase of interest, maintained situational interest, a person finds ways to relate this information to other available information. In this phase, as interest is sustained, a person is also beginning to develop an appreciation of the content (Hidi & Renninger, 2006).

The analysis focused on the visitors' interpretation of the themes presented, on affective comments and value attributions, being indicators of emerging or existing interest.

Results

The data from our participant observations show that the interaction with the exhibition results in visitors' feelings of enjoyment, involvement and stimulation. According to the Person-Object-Theory of Interest, these are the most typical emotional aspects of an interest-based activity. Hands-On media were especially successful in attracting and holding the attention of visitors. Exhibition components that helped to visualize certain phenomena were also very much appreciated by the visitors and initiated social interaction (visitors using the exhibit together, e.g. parents explaining the phenomena to their children, or visitors discussing the themes presented). The sofa was a main point of attraction, with visitors watching and comparing the different primate portraits for long periods, sitting down and taking photographs of themselves (fig. 5). Comments such as "It looks like grandma's living room with our family pictures!" were often heard, which indicates that these visitors felt connections to their daily life at this specific part of the exhibition.

Visitors interrupted their interaction with the exhibition when there was visible activity in the apes' enclosures; they went to watch the animals and came back afterwards. The exhibitions' information and messages were sometimes related directly to the zoo's individual animals. For instance, a man pointing at a gorilla's picture: "Look, there is Viatu!" [name of male gorilla at Frankfurt Zoo].

Visiting the The exhibition's The subject I felt connections exhibition was fun themes are matters were clear between the exhibition and important to me to me

The time spent at each part of the exhibition differed from visitor to visitor. In general, children stayed

real/daily life

Figure 6

N=156

strongly

strongly 1 disagree

4 agree



longer with hands-on media, adults longer with text information and a video presentation about conservation issues. Quiz games and exhibits where visitors were asked to compare, think and find a solution (e.g. choosing between different types of dentition to find the one that is best adapted to certain kinds of food), were used equally long and intensively by children and adults. Many visitors spent up to 15 minutes at these exhibits. This finding shows that situational interest was caught and maintained.

These results are confirmed by the guantitative data from our guestionnaires (N=156): On a four-point Likert scale (ranging from "strongly disagree" to "strongly agree"), most visitors stated that visiting the exhibition was fun (91.4% "agree" or "strongly agree"). They recognized the relevance of the biological topics ("The exhibition's themes are important to me": 82.5% "agree"/"strongly agree") and did not have problems understanding the information presented ("The subject matters were clear to me": 94.2% "agree"/"strongly agree") (fig. 6).



Our results show that interest development is positively influenced if visitors become aware of connections between the information presented and their individual lives. This awareness leads to significantly higher interest and understanding (fig. 7). Connections between the exhibition and daily/real life were starting points for further and deeper engagement with the exhibits.

Discussion



Our findings show that situational interest can be triggered by offering zoo or aquarium visitors opportunities to get involved in an interactive exhibition in addition to the observation of the living animals. If the exhibition is set up adjacent to the enclosures, visitors can combine both activities. They can observe the animals and visit the exhibition. Depending on the situation, they can choose to watch the animals (e.g. when they are visible and active) or get involved with the exhibition and possibly gain knowledge and a better understanding of these specific animals. Links between the zoo's living animals and the exhibitions' themes are often drawn. Adopting such an approach might not only creates less competition between watching the animals and visiting an exhibition in a separate room somewhere in the zoo, but also offers opportunities to connect the observation of animal behaviour directly to the acquisition of background knowledge.

However, the development of interest is strongly influenced by the educational approach and the type of media used in the exhibition: visitors stay longer and are increasingly involved if the exhibit offers opportunities to play and to acquire information by being actively involved (e.g. interactive quiz game) and/or if the exhibit initiates social interaction. If visitors become aware of connections between the exhibition's theme and their own individual life, interest is more likely to be caught and maintained. Longer interaction with topics that connect to daily life and are meaningful to the visitors leads to better understanding.

Condusion

We conclude that interactive exhibitions in zoos or aquariums can help visitors to develop positive attitudes and gain knowledge. Such exhibitions should get visitors actively involved. They should offer opportunities to observe the living animals and use the exhibits next to each other to be able to relate the information directly to the zoo's animals. Phenomena presented should connect with the daily life of visitors. Such an approach offers visitors opportunities to develop interests which are likely to make them receptive to acquiring new knowledge and finally a better understanding for the importance of preserving the natural world.



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A Study of Public Education in Zoos with Emphasis on Exhibit Labels

by **Ruth Martin** | Curriculum Area Manager Cornwall College | United Kingdom

Abstract

The methods employed by the British and Irish Association of Zoos and Aquariums (BIAZA) registered UK zoos to educate the public were investigated by questionnaire survey. The results showed varied use of methods and style/durability of exhibit labels, but that label content was similar. Observations at three zoos showed that about 20% of visitors read exhibit labels and reading time varied considerably. Therefore, exhibit labels should not be the only source of information.

Introduction

Zoos are living museums; they exhibit animals (Mason, 2000). Zoos have an education remit set out in the Zoo Licensing Act of 1981 (legislation.gov.uk). This is emphasised by WAZA (2005) "education will be seen as an important conservation activity" and may include myriad methods including: guidebooks, talks, encounters, tours and exhibit labels (Heimlich et al., 1996). Zoos have the potential to educate large numbers of people as "over 10% of the global human population visits... zoos" (Whitehead, 2000) and a broader demographic than other forms of museum (Mason, 2000).

This investigation is focussed on labels: potentially useful tools for education as they are available to the visitor any time they wish to learn (Serrell, 1987). Previous studies of traditional museum labels indicate that visitors are disinclined to read them as they are visiting for entertainment (Juniper, 2000) although a different study shows there is no difference in learning outcomes from adults that visited for entertainment or for learning purposes (Heimlich et al., 1996). Aim: To discover whether visitors to zoos read exhibit labels.

Null hypothesis: Zoo visitors do not read exhibit labels.

Method

The investigation comprised two sections:

Questionnaire

A questionnaire was designed to inquire about the educational opportunities available in zoos around the UK.

The questionnaire was posted on the BIAZA forum. Approximately 70 zoos are registered with BIAZA providing opportunity to check the forum and take part in the survey.

The questionnaire was also disseminated using direct mail shots.

Observations

Three zoos were identified for investigation: Edinburgh Zoo, Bristol Zoo and Paignton Zoo. At each zoo two sets of observations were carried out; 90 minutes at the Asiatic lion (*Panthera leo persica*) enclosure, and 90 minutes at the lemur (*Lemur catta*) enclosure. The observations recorded three factors: the total number of visitors at the enclosure, how many visitors looked at the exhibit label; and of the visitors that did look at the label how long they stood reading it.



Results

Questionnaire

Sixteen zoos returned completed questionnaires (six from the BIAZA forum, and ten from direct mailing); a satisfactory response rate of 23%.



Figure 1 shows the range of educational methods used in UK Zoos. It is obvious that guidebooks, talks, and labels are used most. It shows that labels were not universally employed but are the most widely used tool for education in zoos.

All the collections labels have text including: common name, status, habitat, the country of origin and general facts. One collection did not have the scientific name listed on their exhibit labels; this might be a questionnaire completion error. Labels from 38% of respondent zoos contained information about the individual animals; visitors often want to know more about the actual animal they are viewing to make the experience more personal, it can also help to limit "museum fatigue" (Miles, 1987).

Figure 2 shows the types of images used on exhibit labels; commonly a map and photo. The limited image type is surprising as they are excellent communication tools (McLean 1993); convey information at a glance, make labels look more attractive (Deehan 1987), and cross language barriers.



Approximately half (56%) of collections have a uniform style to their labels. It is claimed that visitors are able to use familiar labels more effectively (Serrell 1987). Conversely it could be claimed that if the labels all look the same it is easier to become blind to them and not read any.

There does not seem to be a difference between use of permanent (44%) or non-permanent (56%) exhibit labels. Permanent exhibit labels, usually tough plastic, have the benefits of a more professional appearance and are durable. However they can be very expensive and may limit the frequency of up-dating. Non-permanent labels, usually laminated card, are the opposite.

Some collections (44%), especially if their labels are uniform in style, use a standard label size. Labels need to be large in size so that visitors are able to read them easily from a distance of four feet so that visitors can glance at the sign and the enclosure at the same time, plus allow multiple visitors to read the sign at any one time (McLean 1993).

Observation Results

Three BIAZA registered UK zoos were visited; Edinburgh Zoo, Bristol Zoo and Paignton Zoo. At each zoo visitor observations were carried out at two enclosures; Asiatic lion and ringtail lemur, for 90 minutes. Two record sheets were used to monitor how many visitors attended the enclosure and how many of those read the accompanying label.

Tabl	e	1

	Total Visit Number	or	Number o	f Readers
	Asiatic Lion	Ringtail Lemur	Asiatic Lion	Ringtail Lemur
Bristol Zoo	222	183	61	2
Paignton Zoo	231	211	33	27
Edinburgh Zoo	132	116	29	8
Total	585	510	123	37

Table 1 illustrates the actual number of visitors that visited each enclosure at each zoo and of those how many read the label. Table 2 shows this information in percentage form; the most read label was the Asiatic lion label at Bristol Zoo with 27% of the visitors to the exhibit reading the label. The least read label was the ringtail lemur label at Bristol Zoo with only 1% of the exhibit visitors reading the label.

Table 2

	% Reade Asiatic Li Labels	rs of on	% Reade Ringtail I Labels	rs of Lemur
	Male	Female	Male	Female
Bristol Zoo	24 30		1	1
Paignton Zoo	19	13	19	13
Edinburgh Zoo	20	27	6	8



Figure 3 depicts the average total visitor number for the three zoos against the average number of visitors that read each label. It is evident that few visitors read the labels and as such no statistical tests have been applied. Evidently more visitors read the lion exhibit label which raises questions to be addressed in the discussion.



Figure 4 illustrates the average time visitors spent reading labels at all three zoos during the experimental period. Evidently visitors spent less time reading the lemur exhibit labels, but perhaps surprisingly the time spent reading the lion label was very variable.

Discussion

The data shows the minority of visitors read labels; perhaps due to the static nature of the medium. This may be enhanced by the variety of learning styles identified, including visual, auditory, kinaesthetic, and tactual (Thomson and Diem, 1994). Obviously labels cater to the visually orientated learner and this restriction will limit the appeal of labels.

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An important feature of a label is that it is always present for any audience; this enables visitors to manage their own learning and also to learn accidentally (Serrell, 1987). This availability and therefore exposure to environmental elements means the materials and budget of the institution must be considered.

There is no indication in the data (Tables 2 and 3) that visitor demographic affects whether labels are read. Although "Lone Adult" is the most frequent label reader, the underlying numbers are small and therefore potentially an unreliable indication. This is frustrating as it prevents identification of target groups, whether those visitors currently using the labels, or those that never read them, hence barring specific development. It is well known that "the more you know about your visitors the better you can fulfil your institutions goals" (Punt, 1989).

Table	3
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	% Readers of Asiatic Lion Labels			% Readers of Ringtail Lemur Labels			
	Lone Adult	Adult +2	Fam	Lone Adult	Adult +2	Fam	
Bristol Zoo	100	37	23	0	4	0	
Paignton Zoo	100	8	18	100	18	10	
Edinburgh Zoo	67	48	15	20	12	3	

Figure 4 indicates that visitors spent more time reading the Asiatic lion labels than the ring-tailed lemur labels. This may be due to a variety of reasons including:

Animal location. Both the Bristol Zoo and Paignton Zoo lion enclosures are near the zoo entrance so visitors encounter them early in their visit when they are still enthusiastic and open to learning.

Popularity. Lions are probably more popular. Lemurs can be difficult to spot, and visitors might think it's just another monkey. The Edinburgh Zoo lion enclosure is at the back of the zoo so visitors had a long trek to get to see the animals but still they were prepared to read the label.

Label location. Most of the zoo labels were obvious and if visitors wished to find out more about the animals they were viewing they could have easily located a label. However, previous studies have reported labels that were not immediately obvious and the placement was not ideal hence not functioning at the lowest level (Tisdell, 1987). This was not the case for any of the labels included in this practical study.

The labels studied were of satisfactory design in that they were:

- attractive and colorful
- had lots of images
- contained information about the species and its conservation status
- well positioned
- contrasting in color and of suitable font for maximum clarity
- an appropriate size and shape

Technically they should be well suited to the purpose and the visitor should gain from their presence. It was surprising that visitors did not take more notice of the labels but 20% is sufficient enough to warrant their continued presence. It would be recommended that institutions retain the labels and continue to update them on a regular basis but also supplement them with other mode of education for the general visitor. and very few of the visitors that read the label approached this value.

learned from the label.

Inclusion of more labels. A wider variety of label designs and animals could have been used to test the impact of those variables on the success rate of the label.

Developments of this study could include:

to discover what they information they had

Clearer definition of "reading." In this study

"reading" was defined as glances at the labels of two seconds or more resulting in a high

to read the full label was made for each label

percentage of visitors that only spend one to five

seconds reading the labels. A record of time taken

Testing of retention of information. The visitors

that read the label could be interviewed informally

Inclusion of more zoos in the study. To test whether the visitor reaction is the same in most zoos or whether it is specific to the zoos included in this particular study.

Increased observation time. Length of time monitoring visitor interaction with labels could have been increased to get a more comprehensive view of visitor behavior. This would help decrease variables including time of day and weather conditions.

A note of the animal presence and activity level could be made to assess whether this had any impact of visitor behaviour.

Condusion

Institutions utilize a range of educational methods to inform the general public that visit their animal collections. These methods include guidebooks, labels, talks, tours and encounters. Although exhibit labels are ubiquitous, only approximately 20% of visitors read them, therefore a combination of educational methods would appear necessary to communicate with visitors. It is through this range of methods that zoos will be able to communicate their messages of animal welfare and conservation to their visitors in a manner in which the visitors will take something away from the experience.

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EFERENCES

Research on Visitor Receptiveness to Conservation Messaging and its Impact on Exhibit Design

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The role of zoological institutions, especially large theme parks, as environmental education providers has recently been questioned, in part, due to a lack of comparative publicly available data on long term outcomes resulting from these experiences. SeaWorld Parks and Entertainment (SEA) commissioned research to both assess the conservation education impacts that accrue from visits to the three SeaWorld parks and Busch Gardens Tampa and to better identify the unique psychographic profiles of its visitors to better design its experiences and messaging to have the greatest conservation impact. Our evaluation approach acknowledged the unique characteristics of the SEA parks and hypothesized that although they are in some ways comparable to other nonprofit local zoos or aquariums, that there may be significant differences in visiting motivations and learning outcomes.

We recognized that people have different psychological, cultural, and political reasons for visiting paid attractions such as SEA, and that the effectiveness of our conservation communications and efforts are impacted by these differences. The study used a three-part sequential mixedmethods approach to answer these questions. The process was initiated with data mining and analysis of focus group data previously collected by the SEA Marketing teams, followed by and eight focus groups conducted onsite with SeaWorld and Busch Gardens visitors, and concluded with a representative post-visit national quantitative survey of visitors.

The focus groups revealed that participants believe that SEA is involved in conservation and conservation education efforts. These efforts were welcomed, expected and desired attributes of the parks, but were considered not well advertised. Most participants welcomed additional efforts and messages as long as they were offered a choice in receiving them, with some noting that positive message framing was most inviting. Longterm passholders, or those who most frequented the parks even identified the company's conservation efforts as their own, believing that their membership and awareness of SEA efforts contributed to their identity as a conservationist.

The focus groups also revealed that education efforts were considered integral to the mission of zoological parks like the SEA properties, and in contributing to positive and lasting impact on guests. On this basis, the parks were considered by all participants as trustworthy sources of information. As trustworthy messengers, participants requested more interaction with staff, better advertising of these conservation education opportunities and clearly defined roles and responsibilities for staff in animal areas. These results were consistent across visitor segments, even those more interested in rides, expressed interest in learning more about the animals.



Guests play an interactive game where they learn the threats to sea turtle survival.

Results of the national representative post-visit survey (N=2221) indicated that all parks attract some visitors who are already conservation minded and have altruistic views about protecting wildlife and nature. Those more conservation-minded visitors are more likely to report increases in their conservation knowledge and attitudes, and appear more attentive and supportive of the education programs offered by SEA staff. These visitors are also likely to support more overt discussion of SEA efforts in conservation and are equally likely to increase their favorable perceptions of the organization if they become aware of these efforts. Data collected through this study demonstrate that experiences at the SEA parks, no matter where they are on their conservation-learning journey, result in overall perceived increases in conservation values and knowledge. The psychographic profiles identified offer an insight into the degree of change, and the motivations that support that change. Once value sets were identified, the increase was evident even in those groups least likely to describe an interest in conservation or claiming to be most resistant to the educational messaging; that is, they still reported an increase in some dimension of conservation learning.

Psychographic Profiles in the Segmentation Study

In contrast to prior national research through the AZA coordinated Why Zoos and Aquariums Matter (WZAM) projects, these results identified six dominant psychographic profiles for visitors that are consistent for the SeaWorld Parks and Busch Gardens Tampa. Each group demonstrated some degree of increase in overall conservation learning, but the type of increase varied according to their motivation, with some minor variation that could be attributed to age or income.

Animal Enthusiasts (5%)

This group visits the park to observe how the animals and exhibits change over time. Animal Enthusiasts are most likely to work in the garden, contribute to an environmental or conservation organization, visit zoos, aquariums and national parks, and participate in other activities such as camping, snorkeling, and scuba diving. Animal Enthusiasts worry a lot about the effects of environmental pollution and report making a strong effort to recycle. They are highly engaged environmentalists who would be willing to pay more for a product with natural ingredients or to buy from companies that support charitable causes. Although they reported increased commitment to protect the environment and wildlife, they did not report much more empathy or a better understanding of nature conservation issues because of their visit, primarily because they already have a high level of knowledge of environmental issues before visiting a SEA park.

Social Connectors (36%)

This group comprised the greatest percentage of park visitors. Social Connectors strongly believe that SEA parks play an important part in a child's life to get out and enjoy nature and that nature experiences are an important part of childhood. They strongly agree that SEA provides information on conservation efforts and value SEA for educating individuals about animals and habitats. Social connectors value experiences that encourage reflection and the ability to make them more knowledgeable and interested about environmental issues.

Living World Explorers (17%)

Living World Explorers view SEA as a place where they can appreciate and experience nature and living animals, develop care for nature and spend time with family or friends in a nature environment. They love nature and a visit to SEA provides a better understanding of nature conservation issues and renews their commitment to protect the environment and wildlife. Living World Explorers strongly support causes that are concerned with wildlife and make a special effort to buy from businesses that are environmentally conscious. They also place greater importance to zoological activities than most other profiles.

Adrenaline Junkies (10%)

Adrenaline Junkies do not visit SEA to relax, to learn, or to change their perspectives on conservation; instead they are drawn to the rides and to socialize with friends. Adrenaline Junkies are least likely to make an effort to recycle, or to be willing to pay more for a product with all natural ingredients. They are also not likely to make a special effort to buy from businesses that are environmentally conscious or to buy from companies that support charitable causes. Adrenaline Junkies are least likely to work in a garden, visit an aquarium, national park or zoo, or to contribute to an environmental or conservation organization. However, there is a distinct divide within this profile. Adrenaline Junkies under the age of 25 don't view SEA as valuable for educating individuals about animals and habitats, as a valuable information source for wildlife conservation and protection, restoring and cleaning up habitats and ecosystems, ocean conservation, pollution or water and energy conservation in homes. However, a majority of Adrenaline Junkies over 25 recognized SeaWorld as a source of information on how to protect and conserve the environment, and many expressed that they developed more empathy with animals after their visit.

Fun for All (18%)

Fun for All members view SEA as a place to relax and to find a spiritual connection within nature. They are not interested in recycling and do not seem concerned about the effects of pollution. They are less willing to pay more for an organic product, to buy from environmentally conscious companies, or to make a special effort to buy from companies that support charitable causes. They visit aquariums and zoos less frequently and are less likely to contribute to an environmental or conservation organization. Likewise, they are less likely to recognize the importance of marine life park and aquarium activities such as promoting environmental conservation, help species in the wild by studying their biology and physiology, and to fund research projects that help marine mammals.

Members of this group agree that SEA is valuable for educating individuals about animals and habitats, however they are less likely to agree that this leads to helping children learn and explore the natural world. They also believe that SEA is a place that provides information on ways to protect the environment but are less likely to agree that SEA is a valuable information source for restoring and cleaning habitats, global climate change, or pollutions.

Adult Fun Time (14%)

This group claimed virtually no interest in visiting zoos and aquariums but these respondents did have an interest in visiting SEA parks. Members of this group view SEA as a valuable source of conservation information and action. They agree that SeaWorld is a place that provides information on how we can help protect the environment and should offer explicit direction on conservation efforts. Members of this group did not express a strong feeling towards nature experiences being an important part of childhood. They felt that SEA offers parks where they can find a spiritual connection with nature, but they do not necessarily come to restore their connection with the natural world, or to experience and appreciate nature and living animals, so this result appeared to demonstrate that they recognized important attributes of the parks that were not motivational for their visits.

Interestingly, a visit to SEA did not elicit more commitment to protect the environment and wildlife, or help to develop more empathy with animals. Members of this group looked to SEA parks to "handle" conservation and environmental education issues, thus removing them from personal responsibility and accountability. Uniquely, this group did not overlap with the WZAM results, but those over 55 did claim that they increased concern for animals as a result of their visit, a result we believe is more likely due to the presence of grandchildren or second generation children of older parents attending as part of the visit and likely guiding the focus of the visit toward animals and the associated education messaging.

Putting Research Into Practice

Armed with these results, SEA staff undertook an assessment of existing programs and recognized an opportunity to put these data to use immediately. TurtleTrek, a new animal attraction at SeaWorld Orlando was under construction. The exhibit includes a journey through two naturalistic habitats for manatees and sea turtles, two species that SEA supports through in-situ and recovery programs. In the exhibition, visitors discover that some of these animals were rescued by SeaWorld, often for preventable problems, and learn what makes each species so special. Inside the domed theater, visitors are surrounded by a hyper-realistic, 3D 360-degree film that takes them on the amazing life journey of a sea turtle. The experience is all around and even above visitors, giving them a turtle's eye view of their incredible ocean journey. The film's closing call-to-action urges visitors to conserve the world we share through simple actions that reduce our impact on the ocean. TurtleTrek recognizes the power in each of us as everyday heroes, making a world of difference.

Visitors linger in the above water turtle and manatee viewing area to interact with educators and compete with each other on the "Race for the Beach" video game. Each player chooses a sea turtle species, searches for their unique food items and dodges natural and human-related threats as they race for the beach to lay eggs. TurtleTrek's gift shop continues the attraction's inspiration as guests see exactly how a portion of each dollar spent benefits on-the-ground wildlife and habitat projects through the non-profit SeaWorld & Busch Gardens Conservation Fund. Also, starting at TurtleTrek, SeaWorld eliminated plastic gift bags. SeaWorld Parks & Entertainment is the largest theme park operator to make this commitment, saving an estimated four million plastic bags per year from entering landfills and possibly impacting wildlife.



Through an interactive display, visitors see how their purchase directly supports conservation.

Activity	Psychographic Profiles					
	Animal Enthusiasts	Social Connectors	Living World Explorers	Adrenaline Junkies	Fun for All	Adult Fun Time
Unobstructed manatee viewing	X	Х	Х		Х	
Manatee interactives (physical/manipulatives)	Х	X	X			
Manatee static graphics		X	X			
Unobstructed sea turtle viewing	X	X	X		Х	
Sea turtle static graphics		X	X			
Educator presentation		X	X			
3D Show	X	X	X	X	X	Х
Race to the Beach game	x	X	X	X	X	Х
Conservation Fund store donation interactive	X	X	X			

We aligned the exhibit elements to this research to determine what experiences would resonate best with each audience and what audiences required more elements that aligned with their interests, affinity and attitudes. Elements were modified or added based upon this analysis. Early analysis shows that this attraction has interest across all of the psychographic profiles, although each profile responds to the elements of the attraction in different ways.

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