

# ize

## INTERNATIONAL ZOO EDUCATORS ASSOCIATION JOURNAL

51/2015



The IZE is an association dedicated to expanding the educational impact of zoos and aquariums worldwide. Its mission is to improve the education programs in the facilities of its members, to provide access to the latest thinking, techniques, and information in conservation education and to support excellence in animal care and welfare.

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**Mission:** to improve the education programs in the facilities of its members, to provide access to the latest thinking, techniques, and information in conservation education and to support excellence in animal care and welfare. IZE facilitates communication and professional development among zoo/aquarium educators and supports liaison with related organisations such as WAZA (the World Association of Zoos and Aquariums), IUCN, in particular the IUCN/SSC-CBSG (Conservation Breeding Specialist Group), and others.

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**Submissions:** The IZE welcomes articles by zoo and aquarium educators from across the world at any time. Final deadline for the next issue is 31<sup>st</sup> March.

To submit an article please contact the appropriate regional editor. Contact details on the back cover.

**Editor:** Stephen Woollard

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## From the IZE President, Rachel Lowry



Lifelong learning is widely accepted as a vital ingredient in capacity building for a sustainable future. In my term as President, I've valued the opportunity to witness the many incredible contributions that zoos and aquaria contribute to their communities. I remain resolved that zoos ignite a passion for lifelong learning and our natural world, and are fast

becoming one of the most powerful groups within the education and conservation sector thanks to our collective reach, the animals that we are entrusted to care for and the quality of our education experiences. It was made clear at the 2014 IZE conference that one of the greatest challenges ahead for zoo and aquarium educators is to remain committed to evaluating our impact, so that we can continue to improve and celebrate what we achieve. I'd like to congratulate Stephen Woollard, IZE's Journal Editor for generating the 2015 edition of the IZE journal, for it takes a significant step forward in rising to this challenge.

Miguel-Angel Vieyra-Guzman, IZE's Regional Representative from Latin America reminds us via his publication in this journal that IZE has produced more than 37 annual journal publications. Across these 37 journals, more than 623 authors have contributed to writing more than 777 journal articles. Thanks to these contributions, IZE journals remain an incredible resource for zoo and aquarium educators, and provide us all with a valuable insight into how our practice as a community continues to change and evolve to ensure that we effectively fight the extinction of wildlife and wild places.

The shift away from zoo-based learning experiences that focus predominately on the acquisition of wildlife knowledge and towards influencing conservation sensitive attitudes and behaviors is incredibly exciting. Based on current trends, the Convention of Biological Diversity tells us that an estimated 34,000 plant and 5,200 animal species – including one in eighth of the world's known bird species currently face extinction. And as we know, this rate of extinction is not based on natural extinction rates but rather due to unsustainable human behaviors.

I look forward to sharing this journal with my peers to showcase how zoo-based education can play a role in ensuring that our communities actively value and work to protect our threatened species. As I head into what will be my final year as President of IZE before handing over to the very talented and committed Isabel Li from Hong Kong Ocean Park, I also look forward to seeing you at Tamaiken Zoo in October 2016, where we will once again join as a community to support one another in boosting the capacity and standards of zoo-based education. At next year's conference, we will turn our attention to crafting effective narratives that serve the species that we are privileged to work and care for, a skill that we all place great value upon, and one that many from inside and outside the zoo community are increasingly recognizing as one of our signature strengths as zoo educators.

Rachel Lowry

President International Zoo Educators Association  
Director Wildlife Conservation and Science Zoos Victoria

**IZE Conference 2016: Fundacion Tamaiken, Buenos Aires, Argentina**

**18-22 October 2016**

**Call for papers**

**November to 1<sup>st</sup> March**

**Early bird registration**

**30<sup>th</sup> April**

**Final registration -**

**15<sup>th</sup> September 2016**

# Contents

# IZE Journal No.51

- 3 From the President, *Rachel Lowry*
- 5 From the Editor, *Stephen Woollard*
- 6 ZooEscola: A Teacher Training Program of São Paulo Zoo, Brazil  
*Kátia G. O. Rancura et.al.*
- 10 Kalahari Connections: fostering long-term positive conservation behaviors in Botswana youth  
*Erin Stotz et.al.*
- 15 Bridging the Gap to Form Meaningful Connections between Underrepresented Minority High School Students and Wildlife Science Professionals  
*Courtney Raquel Wiggins, Karen Tingley*
- 19 Assessing 37 years of success of the IZE journal: a bibliometric approach  
*Miguel-Angel Vieyra-Guzmán*
- 22 Can Anthropomorphism Help Save the Leadbeater's Possum  
*Dr. Jeffrey C. Skibins, Amy M. Smith & Jacquie O'Brien*
- 26 The Nature of Interaction Between Zoo Docents and Visitors and the Use of Inquiry  
*Kathryn L Marcussen,*
- 30 Education Programs – Not just for our Visitors *Grant Aggett-Cox*
- 33 Hope Taking Root at Chester Zoo *Maggie Esson & Andrew Moss*
- 37 Living with Wildlife – A targeted pilot conservation education program for newly arrived refugees to Australia.  
*Wayne Walters*
- 42 Latin American zoos & aquariums joining efforts on a Jaguar Education & Conservation Campaign *Sonia Álvarez et.al.*
- 45 A Latin American Experience: Education Conservation Campaign of the Jaguar at the Buenos Aires Zoo *Natalia Maruscak and Marcela L. Diaz*
- 49 Experiencing biodiversity - the interactive activities at Opel-Zoo Kronberg  
*Tina Braun, Alexander Popp and Prof. Dr. Paul Dierkes*
- 52 Diversity- the difference is in the detail! Educators effecting awareness and behaviour change through Visitor Engagement  
*Adam Senior, Myfanwy Griffith*
- 55 Teacher Training in the Zoo: A pilot project at the Parque das Aves, Brazil  
*Angela Tischner, Oliver Davies, Thiago Reginato*
- 58 "ConCiencia Activa" An Environmental Education Program: a holistic and integrating approach *María Laura Schiffrin, Bárbara Reich, María Emilia Garro Vidal*
- 62 Conservation Behaviour: Change Begins at Home  
*Judy Mann*
- 65 Protecting Pineapple *Jennifer Stover*
- 67 Evaluating Night Stalk: A nature-based community engagement activity designed to motivate conservation actions  
*Amy M. Smith & Suzi Dolan*
- 70 Learning by designing learning objects in zoo and wildlife education  
*Jens Hepper*
- 72 Conservation education; a practice for everyday life  
*Sayonika Dasgupta*
- 74 Online resources presented at the 22<sup>nd</sup> IZE conference  
*Miguel-Angel Vieyra-Guzmán*



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INTERNATIONAL ZOO  
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# From the Editor

Stephen Woollard

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As this 2015 IZE journal goes to print it is about a year since we met for our biennial conference at Ocean Park, Hong Kong. The conference was a great success, not least because of the contribution made by all the speakers and delegates, sharing their experience, knowledge and expertise. This issue of the IZE journal continues that networking and sharing, and embodies the spirit of what IZE is about.

I am delighted that we have a wide range of articles from across the globe, but also that in anticipation of our 2016 Conference in Argentina, we feature a number of contributions from Latin America, including reports on a collaborative approach in many collections across the region, to education and conservation focused on the jaguar - as featured on the front cover.

Another area of particular interest featured, is the training of teachers and enabling them to be 'environmental educators' too. For success, identifying, working with, and adapting to meet the needs of, appropriate target audiences for different programmes and messages, is reflected upon in several articles as well.

Thanks must go to all the authors and to the excellent group of IZE regional representatives, who have collected the articles together for me to edit and compile into this publication.

In the 'modern era' it is so easy to communicate across the world, quickly and cheaply through the media, internet and mobile devices. However advantageous as that may be, our conferences and journal provide real and meaningful connections and opportunities for enhanced understanding and development of practice, both individually and collaboratively.

So I hope that you read and share your copy of the IZE Journal with others, and keep it alongside previous issues as an archive and 'data-bank' of ideas and reflections upon environmental and conservation education.

This year I celebrated 28 years working in zoo education - and I am still learning. However, I strongly believe in sharing my experience with others, proposing new ideas and posing questions, and also challenging myself to do more and make a difference. I was delighted to be asked by Twycross Zoo, situated in the middle of England, to lead their Learning & Discovery team from March 2015, and so after 10 years in Edinburgh, moved - with my large library - to Twycross - where I actually began my zoo education career with Malcolm Whitehead in 1987. So at the IZE conference in Hong Kong, and at our European zoo education meeting I attended in Portugal this year, I looked around the room at many new, excited and enthusiastic young educators; with a few of my 'old' friends there too of course; and could see that 'zoo education' is alive and well, which is again demonstrated by the wealth of articles in this journal.

Unfortunately, we need to act quickly and with greater urgency to secure species survival and the future of our planet for future generations. At the same time, in moving into my new job, and discovering our large nature reserve on site at Twycross Zoo, and re-aquainting myself with elephants and giraffes (neither of which are in Edinburgh) I was reminded of how important the simple 'enjoyment of nature' and 'wonder at living things' is to engendering an ethic of conservation and care for life around us, and that the 'negative' message about the loss of species and habitats needs to be tempered with the positive.

I hope that you enjoy this full edition of the IZE Journal and apply lessons learned to your own practice and submit articles for our 2016 journal (deadline March 31<sup>st</sup>).

Stephen Woollard,  
IZE Editor,

Head of Discovery & Learning, Twycross Zoo, East Midland Zoological Society, UK

*Article edits and corrections: The articles in this journal are reviewed by the IZE team. Where necessary small corrections, edits and revisions are made. Illustrations, tables and figures are included from authors, however, the quality of their reproduction is dependent upon the original files, not all of which are easily edited.*

**Submissions for the IZE 2016 Journal are now invited - please send to the regional representatives no later than March 2016. See [www.izea.net](http://www.izea.net) for further instructions.**



# ZooEscola: A Teacher Training Program of São Paulo Zoo, Brazil

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Zoos have undergone a major evolution in recent times. From spaces dedicated only to recreational purposes, these institutions have become important as wildlife conservation centers. According to the World Association of Zoos and Aquariums [WAZA], these locations receive about 700 million people every year, and just for the São Paulo Zoo, in Brazil, this number is approximately one and a half million people. Therefore, it is evident the connection of São Paulo Zoo with society and the need for continuous improvement of its activities for the consolidation of the pillars that justify its existence - education, research, recreation and species conservation.

Since the beginning of the Environmental Education Program of the São Paulo Zoo, in 2002, it was noted the need to cover a very special audience: teachers. No one has greater importance in the construction of knowledge and educational background of a person than these professionals. In this sense, this paper aims to present a special Teacher Training Program of the São Paulo Zoo called ZooEscola, highlighting its characteristics, perceptions of the participants and particularly of the 2014 program. Also, we present guidelines that can support and inspire other environmental educators to develop their own programs, to strengthen the interaction between formal and non-formal educational institutions and increase the contribution of zoos in transforming attitudes towards environmental issues.

## 1. The ZooEscola Program and the conservation of the Atlantic Forest

The Atlantic Forest, considered one of the richest areas in biodiversity and most threatened on the planet, currently covering an area that represents only 8.5% of its original formation. Nowadays, the few existent areas of Atlantic Forest in Brazil are highly fragmented. One of these fragments is the Fontes do Ipiranga State Park (Figure 1), a protected area that has approximately 5.25 Km<sup>2</sup>, located at São Paulo City in an urban area with high population density (Fernandes et al., 2002).

Since the São Paulo Zoo is placed into the Fontes do Ipiranga State Park, this institution plays an important role in the conservation of this area and also of this biome. Aware of this responsibility and from previous experience in teacher training projects,



*Figure 1: The Fontes do Ipiranga State Park is the third largest fragment of the Atlantic Forest of São Paulo City.*

the São Paulo Zoo initiated in 2011 the Teacher Training Program “ZooEscola: The Atlantic Forest as a Teaching Tool” (Roberti et al., 2012), which has a partnership with the São Paulo City Department of Education to reach all teachers of municipal schools interested in participating.

Held over a year, the ZooEscola Program basically consists of four steps: theoretical and practical course for teachers; a tour with the students to the São Paulo Zoo with emphasis in the Atlantic Forest; the development of educative projects in schools; and the presentation of the projects and their results at the end of the year to other teachers and staff involved, for evaluation and selection of the most relevant ones (Figure 2).

Since its inception, the ZooEscola Program has trained about 200 teachers, assisted more than 6,000



Figure 2: Zooescola Program steps.

students in guided tours and contributed to the development of approximately 80 environmental projects in schools.

At each edition of the program it becomes more and more obvious its contribution is to make the learning process more dynamic and meaningful, encouraging reflection and the construction of environmental values for educators and students.

### 1.1. ZooEscola Program – 2014 edition: addressing the water issue

In the 2014 edition, in addition to addressing the Atlantic Forest, the ZooEscola Program brought for discussion a vital important subject to all living things: water. According to the situation currently experienced by Brazil, especially in the Southeast region of the country and in São Paulo city, which alert not only to the imminence of a water collapse, but also a crisis of values, it becomes increasingly clear that the development at any cost will make life unbearable in the world. Therefore, it is essential to address this issue in the classroom to stimulate students in having a critical view and attitudes of respect and community towards causes that favor all and consider the balance between the three pillars on which sustainability is based: economic, social and environmental.

Thus, the environmental projects developed at schools should address the conservation of the Atlantic Forest and the water theme. To make this possible, we provided teachers the necessary knowledge on the subjects during the theoretical and practical course and, for the students, a guided tour with emphasis on the Atlantic Forest, native fauna and processes

that involve the use of water at the São Paulo Zoo, in order to bring suggestions for actions that could be applied to overcome the water crisis experienced by the population.

In Figure 3 (below) you can see the route taken during the guided tours with the students at the São Paulo Zoo, involving animals, contents and spaces related to the Atlantic Forest and the water theme.

### 3. Methodological approach

To understand the educational process in the ZooEscola Program 2014 and especially the teacher perception, theoretical and methodological frameworks of research in environmental education that could subsidize the reflection and the improvement of the educational activities developed were considered. In order to analyze each step of this Teacher Training Program, we used data collection instruments in a qualitative research approach (Denzin et al., 2005)



and in a critical environmental education perspective (Carvalho, 2001; 2004; Guimarães, 2004; Layrargues, 2004; Loureiro, 2004; Sorrentino, 1999).

Therefore, after the theoretical and practical course for teachers and at the end of the year, we applied an open questionnaire to the participants to understand whether the ZooEscola Program's objectives were achieved through the proposed steps. In addition, we also asked about the characteristics of the projects developed at schools.

#### 4. Perceptions of the participating teachers about the ZooEscola Program 2014 edition

In 2014, 37 teachers participated in the program, about 1000 students aged 4 to 15 years were involved, and 14 educative projects were developed at schools.

Among the participating teachers, only 16 responded to the questionnaire at the end of the program. They all reported that the ZooEscola Program fulfilled its objectives mentioning that, after their participation, they acquired knowledge concerning the topics addressed, which many of them didn't have enough information about. In addition, teachers reported that the program provided a greater incentive to carry out environmental education projects at schools and provided an improvement in their teaching

practices, helping them to include the subject in the school curriculum and encouraging the seek for improvement.

Regarding the benefits for students, teachers reported that the ZooEscola Program was a great source of knowledge and helped in the awakening of values in the children, providing an experience considered extremely important for these educators. Below is the perception of some teachers (Figure 4).

In the tables (Figure 5) we can see characteristics of some projects developed during the ZooEscola - 2014 edition

#### 6. Guidelines for elaborating a Teacher Training Program in Zoos

From the experience developed in the ZooEscola Teacher Training Program, we highlight below a set of guidelines that can inspire educators from other institutions to develop their own teacher training programs, strengthening the rapprochement between zoos and schools.

- Establish a partnership with the agency responsible for formal education of your city or region covered by the project;
- Design a schedule considering the entire project, which will facilitate the organization of the infrastructure and the necessary services, as well as guarantee the availability of the team involved at each stage;
- Develop a theoretical and practical programming that includes the participation of different professionals, not limited only to environmental educators;
- Use topics that can be worked with any age group, increasing the participation of teachers;
- Think about the factors that possibly influence the participation of teachers in the project, considering them in the planning;
- Provide educational materials to support the participants, covering all that was addressed throughout the theoretical course and has other relevant sources for reference;
- Provide the necessary guidance to teachers for the development of environmental projects in their schools;
- Establish a standard for the presentation of the developed projects and criteria to evaluate them;
- Disseminate the achieved results by the end of the year, not forgetting also to share them with all employees of your institution.

"It was a full body of knowledge and values to students and to my teacher and personal identity". Teacher 1



"The ZooEscola Program demonstrated in a simple way how environmental education projects could be applied". Teacher 2



"The ZooEscola Program was a great way to properly incorporate the theme into school curriculum". Teacher 3



"We expanded our knowledge towards the animals of Atlantic Forest and the water crisis, improving our educational practice". Teacher 4

## 7. Final considerations

Environmental education is in fact a field of knowledge that contributes to building a more just and environmentally sustainable society, and has a main characteristic being a continuous process of formation of values and attitudes towards the environment.

The ZooEscola Program clearly demonstrates these aspects when it contributes to the reflection and civic education of the participants in a process that in principle takes only a year, but may be the initial stimulus for continued work in the schools, with the potential to reach teachers, students and, through them, the whole community.



Figure 5

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# KALAHARI CONNECTIONS: fostering long-term positive conservation behaviors in Botswana youth

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## **Abstract**

Botswana is characterized by low human density coupled with vast, remote areas containing an abundance of wildlife. In Botswana's Central Kalahari region, Denver Zoo implements a holistic wildlife conservation program based on three key elements: 1) sound science to understand the ecology and behavior of key wildlife species, and the social contexts that affect their conservation; 2) collaborations with local people to build local capacity to conduct conservation, and 3) culturally relevant conservation education programs to increase positive associations between people and wildlife. Denver Zoo's conservation education program in Botswana, "Kalahari Connections," engages local and global partners to create science-based opportunities for youth to connect to Botswana's rich natural heritage in order to foster wildlife stewardship. Kalahari Connections is an innovative inquiry-based and participatory conservation education program including field trips into Botswana's protected areas, teacher-training workshops, culturally appropriate interdisciplinary wildlife curriculum, literacy programs and hiring local partners to design and implement conservation education programming. Initial evaluation results from the program's pilot year in the community of Moreomaoto demonstrate a positive shift in thinking about wildlife for youth who participate in "Kalahari Connections."

Denver Zoo passionately dedicates expertise and resources to saving animals, conserving habitats and educating communities worldwide. Building on our mission, to "secure a better world for animals through human understanding," the Zoo implements holistic wildlife conservation programs in Botswana. Since 1996, Denver Zoo has specifically focused its efforts in and around the Central Kalahari Game Reserve and Makgadikgadi Pans National Park. Denver Zoo's conservation program is based on three key elements: 1) sound science to understand the ecology and behavior of key wildlife species, and the social contexts that affect their conservation; 2) collaborations with local people to build local capacity to conduct conservation, and 3) culturally relevant conservation education programs to increase positive associations between people and wildlife.

Research suggests that species populations are declining in Botswana, and merit conservation action. However, wildlife conservation and human livelihoods, especially livestock-ranching, often conflict in Botswana (Perkins, 1996). Human persecution has caused wildlife populations to decline, many of them dramatically (Frank et al., 2006).

Competition for resources and space creates friction between local communities and wildlife, which has fostered deep rooted feelings of fear and uncertainty towards Botswana's wildlife. Despite Botswana's

rich wildlife diversity and large protected areas, few Botswana residents can afford access to national parks and wildlife tourist camps, and often do not reap direct benefits from wildlife tourism (Moswete et al. 2008). Thus, children rarely experience wildlife in their own backyards in a natural setting (Mbaiwe 2003).

Denver Zoo (DZ) collaborates with Kalahari Research & Conservation (KRC), a non-profit wildlife organization based in Botswana, to save wildlife populations and associated ecosystems by changing people's understandings and perceptions of wildlife. Ultimately, DZ and KRC seek to encourage people to adopt behaviors that create a long-term, sustainable co-existence between people and wildlife.

In particular, DZ and KRC programming focuses on changing knowledge and behaviours in youth ages seven to fifteen in Moreomaoto and Gweta - gateway communities located along the western boundary of the Makgadikgadi Pans National Park. DZ and KRC build foundational support for wildlife conservation and non-lethal solutions to human-wildlife conflicts by creating opportunities for these youth to experience the wildlife around them in positive ways. As research elsewhere in Africa has demonstrated, a shift in culture and thinking around wildlife can directly impact human-wildlife conflicts and transform wildlife from something feared into

something deserving conservation (McDuff & Jacobson, 2001).

### **Is there a need?**

In 2014, with funding awarded from the Association of Zoos and Aquarium's (AZA) Conservation Grants Fund, DZ and KRC conducted an education needs assessment following Jacobson (1997), to identify gaps in wildlife conservation education programming that were potentially hindering wildlife conservation in and around protected areas in Botswana's Central Kalahari region.

Key findings from the needs assessment included:

- A lack of basic science-based content and resources to support local wildlife and environmental education
- A dearth of organizations focused on bringing conservation education to communities bordering the region's protected areas, and
- A strong desire from communities to bring conservation education programs to area youth.

### **Program Development**

The needs assessment strengthened DZ and KRC's commitment to conservation education in Botswana, and they jointly developed Kalahari Connections to address the identified educational gaps. Kalahari Connections targets youth ages seven to fifteen, and primary school teachers. Program goals were conceptualized using a backwards design approach. Backwards design is an established method of developing educational curriculum that involves setting goals before choosing instructional methods (Wiggins & McTighe 2005). Four program goals were defined:

- 1) Foster knowledge about and positive attitudes towards wildlife in primary school age youth living near protected areas,
- 2) Cultivate Botswanan wildlife conservation ambassadors through hands-on positive experiences with wildlife.
- 3) Increase science-based knowledge for youth through connections to researchers, and
- 4) Introduce youth to future career opportunities in the wildlife conservation and wildlife-related tourism sectors.

Using the goals created from the backwards design process, DZ and KRC developed a logic model to highlight specific short, medium and longer term desired outcomes for the Kalahari Connections program. Outcomes focused on changing participant knowledge, attitudes and long-term behaviors towards wildlife:

Knowledge: Participants will know: 1) The importance of wildlife to Botswana's ecosystem, 2) Resources available for teaching wildlife conservation education and 3) Career paths in Botswana linked to wildlife and conservation

Attitudes: Participants will feel: 1) Connected to Botswana wildlife, 2) More positive attitudes towards Botswana's wildlife and 3) Confident in teaching wildlife education.

Behaviors: Participants will: 1) Actively seek ways to protect Botswana's wildlife, 2) Serve as conservation ambassadors within their communities.

### **Share. Collaborate. Learn**

In order to accomplish these goals, DZ and KRC implemented various educational activities, such as teacher-training workshops, culturally appropriate interdisciplinary wildlife curriculum, field trips into Botswana's protected areas, and "conservation conversations" at local libraries in Gweta and Moreomaoto – the gateway communities selected for project start-up. DZ and KRC hired local partners to collaborate on the design and implementation of the conservation education programming.

### **Participatory Conservation Education**

In Gweta and Moreomaoto, meetings were held to gather valuable input from local educators on current teaching methods, conservation education knowledge, and interest in incorporating more inquiry-based activities into the classroom. It was important to give voice to local educators, and to provide an opportunity to have them actively participate in creating and shaping the Kalahari Connections conservation education program.

### **Designing Wildlife-Based Curriculum**

In order to increase science-based knowledge in youth, it was important to augment the primary school environmental education curricula required by Botswana's government. Using the input provided by local educators, DZ and KRC developed and provided teachers with instructional materials to support environmental education and wildlife ecology lessons. A comprehensive, interdisciplinary curriculum in both English and Setswana (Botswana's national language), the curriculum contains cultural and age appropriate instructional materials based on Botswana educator's recommendations, and aligns with Botswana's national curriculum. It also includes educational activities, service learning projects, and environmental education and pedagogy resources.

### **Teacher-Training Workshops**

After the curriculum was complete, DZ and KRC held four training workshops designed to provide instruction on how to implement the inquiry-based lessons. These workshops were attended by over 35 adults including educators and librarians. Research demonstrates the value of teacher workshops. Workshops effectively train educators to develop education programming, practice lesson presentation, and evaluate educational outcomes (Kuhar et al., 2007b). These workshops provided DZ and KRC with insight and feedback on

how participants were planning to use the inquiry-based educational curriculum. Moreover, bringing educators together for trainings served to build a support system among the trainees and cultivated a learning community based on peer collaboration, resource sharing, and the transfer of knowledge regarding educational programming and evaluation.

*Teachers from the community of Gweta who attended a teacher-training workshop aimed at providing culturally appropriate interdisciplinary wildlife curriculum training.*

### **Experience. Connect. Change.**



After gathering input from local educators, and designing curriculum that were culturally and age appropriate, DZ worked with its partners to implement program strategies to achieve Kalahari Connection program goals in Moreomaoto and Gweta. DZ and its partners followed the environmental education model of sequential experiences, as it can lead to positive and proactive behaviors and attitudes about the environment (Farmer, Knapp, and Benton, 2007).

### **Inquiry-Driven Field Trips**

Research on environmental education has demonstrated that a child's positive experiences with nature influences his or her affinity towards the natural world as an adult (Hungerford & Volk 1990; Chawla, 2006). DZ and KRC successfully led field trips with over 150 youth program participants into Makgadikgadi Pans National Park in order to foster positive experiences with wildlife (see Figure 3).

The objectives of the field trips included:

- Expose the youth to wildlife to provide an opportunity to see animals in their natural habitat.
- Create an experience that allows for interaction between the students, local Motswana safari guides and park rangers to help foster student knowledge of careers with wildlife.
- Allow an opportunity for the students to apply their scientific knowledge to real life experiences with wildlife.

Each field trip allowed the children and adults to see Botswana's wildlife in a safe, positive and educational setting. For many participants, this was

their first time in a national park.

### **“Conservation Conversations”**

To complement the field trips, monthly “Conservation Conversations,” a series of discussions on wildlife conservation, were hosted at the community libraries. The events provided an opportunity for local youth to connect with researchers, and wildlife professionals, especially people from Botswana, who have made a career working with wildlife, and learn about their scientific research.

Speakers included:

- Denver Zoo wildlife conservation biologists
- Birdlife Botswana staff
- Guides from area safari outfitters
- Independent conservation biologists working in the area
- Employees of Botswana's Department of Wildlife and National Parks

### **Evaluate. Learn. Grow.**

Successful cross-cultural conservation education is premised on effectively communicating and creating a shared understanding of conservation challenges. As Bettinger et al (2010) observe. “If our ultimate goal is to change behavior, our programs must effectively [and cross-culturally] communicate conservation challenges so in the end we are all talking the same language.”

Denver Zoo is evaluating the Kalahari Connections program in order to ensure DZ's programming is delivering educational content that DZ intends in culturally appropriate, socially relevant and effective ways (Bettinger et al., 2010). Moreover, in an international field setting like Botswana, testing evaluation methods is crucial so that DZ can understand if it is using the right tools for the socio-cultural context, and identify any unintended outcomes of DZ programming.

From September 2013 to September 2014, DZ conducted an initial one year formative evaluation of Kalahari Connections with participating youth in the gateway community of Moreomaoto. DZ is also conducting a formative evaluation of start-up programming in Gweta, which will conclude in October 2015. In Moreomaoto, DZ used a pre-post survey instrument to assess changes in participant knowledge and attitudes, modeled after Kuhar et al.'s (2011) design. Project staff administered the same pre-post survey questionnaire to a sample of 23 participating youth, ages seven to fifteen, at the beginning and the end of the program year. The questionnaire included open-ended and close-ended questions designed to assess changes in children's knowledge about, attitudes towards and understanding of the value of Botswanan wildlife.

An analysis of the pre-post survey results revealed



four key findings:

1. Children surveyed had a high level of recognition of several key wildlife species in the region, including elephants, lions, zebras and giraffes.
2. Denver Zoo did create greater awareness and understanding about the value of the carnivore species it seeks to conserve, especially vultures, among the children surveyed.
3. Denver Zoo broadened surveyed participants' perspectives about why wildlife is valuable, raising awareness about the ecological value of species, especially vultures (see Figure 4).
4. Denver Zoo created a greater recognition of conservation careers and ways to save animals among the children surveyed. However, all children may not have clearly understood what was being asked by the conservation careers survey question.

These preliminary evaluation results suggest that DZ and KRC are facilitating positive change in knowledge and attitudes among program participants. However, evaluation results also suggest that while participants are learning key concepts from DZ and KRC programs, participants may not always clearly understand the evaluation instrument. Going forward, program staff will redesign the survey so that it is more age appropriate and culturally responsive for future applications.

As with all conservation education programming,

pioneering significant social change in people' beliefs about and behaviors towards wildlife is a long-term project (Heberlein 2012, Lefebvre 2013). Thus, while a one-year evaluation provides a foundational snapshot of information for shaping program design, it does not provide the long-term data necessary to fully assess the rate and extent of social change in attitudes and behaviors towards wildlife among Botswana youth participants in Kalahari Connections. Denver Zoo will continue to evaluate Kalahari Connections to monitor program progress over the longer term.

### Next Steps

Initial evaluation results suggest that Denver Zoo programming is creating a positive shift in the ways youth think about and value wildlife in Botswana's Central Kalahari region. Due to the documented success of the Kalahari Connection's initial program year in Moreomaoto, and positive feedback gathered through informal evaluations in Gweta, DZ and KRC are expanding this model conservation education program to four new communities that border the Central Kalahari Game Reserve. Going forward, Denver Zoo will continue to work with partners on the ground to implement and evaluate conservation education programming that promotes positive attitudes towards wildlife, connects Botswana youth to their natural heritage and create a culture of wildlife stewardship.

#### PRE-Survey Overall Reasons for Valuing Wildlife

(Question 8: What are your three favorite animals, and why?)

Reasons	Frequency Count
Aesthetic	15
Safety	12
Physical Attributes	9
National Pride	7
Utilitarian	7
Emotional/Affective	6
Negativistic	4
Tourism	5
Economic	5
Ecological	4
Spiritual	2
Protected	1
Consumption	1

#### POST-Survey Overall Reasons for Valuing Wildlife

(Question 8: What are your three favorite animals, and why?)

Reasons	Frequency Count
Aesthetic	22
Ecological	15
Safety	12
Physical Attributes	11
National Pride	11
Negativistic	9
Utilitarian	6
Economic	2
Tourism	2
Consumption	2
Emotional/Affective	1



## Acknowledgements

“I am because you are” – African proverb

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Above - coded participant responses to the pre and post survey question: what are your three favorite animals and why? Reasons written in by the children were inductively coded by the research team into different “themed” response categories based on prevalent value orientations towards wildlife identified in the literature (Corbin and Strauss 2008).

Safety, aesthetic and physical attributes were the top types of reasons attributed to favorite animals in the both the PRE and the POST surveys. In the POST surveys there was a notable rise in responses citing the ecologicistic value of animals. In fact, ecologicistic reasons were the second most popular rationale cited for valuing animals, and were mentioned 15 times in the POST surveys. The ecologicistic theme is modeled on Kellert’s 1996 list of key wildlife value types; it represents responses that demonstrated concern for the interactions between wildlife and natural habitats, and concern for the environment as a system (Kellert 1996, Clayton and Myers 2009, 17).

Thus, the data from the pre and post surveys suggests that Denver Zoo broadened children’s perspectives about why wildlife is valuable, raising awareness about the ecological value of Botswana wildlife.

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# Bridging the Gap to Form Meaningful Connections between Underrepresented Minority High School Students and Wildlife Science Professionals

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To address the lack of diversity that exists within the fields of wildlife and conservation science, the Wildlife Conservation Society (WCS) developed Bridging the Gap (BTG), a three-year National Science Foundation (NSF) funded Innovative Technology Experiences for Students and Teachers (I-TEST) initiative for underrepresented minority New York City high school students. Over the course of three cohorts, Bridging the Gap has served 150 students and their parents. Selected participants engaged in a host of activities including college readiness seminars, zoo and aquarium internships, and career planning workshops. The implementation of a community mentoring program, in particular, contributed to BTG's overall success.

## **The Need for Diversity and Understanding**

For years, zoos and aquariums have acknowledged the low number of minority science professionals in their field. A diverse workforce allows zoos and aquariums the opportunity to draw on diverse perspectives and cultures to be more relevant and more successful in reaching their conservation goals.

This commitment by wildlife science professionals to be more inclusive is evidenced by the numerous articles, papers, and conference presentations that have addressed this issue (Taylor, 2014).

However, according to U.S. News & World Report, African Americans, Hispanics, American Indians and Alaska Natives (“historically underrepresented racial and ethnic groups,” as described in the report) accounted for 10 percent of U.S. workers in science and engineering in 2010 – up slightly from 7 percent in 1993, but still a far smaller proportion than their share of the general population, which was 26 percent. Generating greater numbers of university graduates who are prepared for occupations in science has become a priority in America as tertiary education continues to play a critical role in establishing strong interest in STEM (Science, Technology, Engineering, and Math) education and careers (Neuhauser, 2014). However, America’s higher education system frequently loses many potential STEM graduates—especially candidates of colour (Chen, 2009).



WCS addressed this need by developing a program that provides underrepresented minority students with career guidance in conservation and wildlife science. From providing university readiness training and internships with wildlife science professionals, WCS has created an effective model for increasing diversity in the zoo and aquarium STEM career workforce. This effort was recently acknowledged by the Association of Zoos and Aquariums. In 2014, BTG received the Angela Peterson Excellence in Diversity Award, given to organizations who demonstrate a commitment to reaching diverse audiences through programming or staff development.

### **The Bridging the Gap Program**

For most young people who are nearing the end of their high school education, selecting a career that fits their interests and goals is a major area of concern (Aud, Fox, & KewalRamani, 2010). BTG recruited high school students between the ages of fifteen and eighteen who identify as an underrepresented minority. Sophomores (tenth grade), juniors (eleventh grade), and seniors (twelfth grade) were eligible to apply. Participants were selected from over forty public and private high schools within the five boroughs of New York City (Brooklyn, Bronx, Manhattan, Queens, and Staten Island) via a process which included an application, essay, and in-person interview with WCS staff.

Once selected, students were assigned to take part in the program at the New York Aquarium,

Bronx Zoo, Central Park Zoo, Prospect Park Zoo, and Queens Zoo—WCS's five sites in New York City. Students attended full day, weekly sessions for nine weeks, as well as two after-school sessions, during which WCS professionals gave talks that shed light on their life and career journey. Full day sessions focused on various elements of STEM careers in zoos and aquariums and were immersive, hands-on, and inquiry-based. BTG's curriculum was consistent across all five sites.

To give students insight into the university admissions process, BTG students participated in a two-day "College Bootcamp." They learned the details of the university admissions process, set long-term and short-term goals, researched prospective universities, learned advocacy skills, and conducted a financial aid and scholarship search. This process provided a strong platform for student success. To date, 88% of the BTG students that are eligible to attend university are either currently enrolled or preparing to attend university in fall 2015. We expect these numbers to grow as acceptance letters continue to arrive and the younger BTG students become eligible to attend university.

During the three years of the program, WCS collaborated with social service agency Good Shepherd Services. The guidance offered by Good Shepherd Services was provided on a monthly basis in an effort to strengthen the areas that were out of WCS's scope of practice (i.e. social work, mental health, and family counseling). Parents and guardians of students were also engaged through informative workshops and regular phone contact. During the parent workshops, attendees engaged with program staff, joined a BTG activity with program staff and students, and discussed university-related topics such as where to attend school, financial aid, and how to acquire scholarships. WCS was committed to keeping parents abreast of BTG's rules/obligations and to engage parents early in the program so that they understood the importance of the project. This allowed for a deeper program/parent connection that would in turn reduce attrition rates and heighten parental interest in supporting their student as s/he pursued a possible STEM career at a zoo or aquarium.

### **Creating Effective and Sustainable Mentoring Relationships**

To further enhance the program's effectiveness and to ensure that students were on-track for program completion, BTG included a mentoring component. In developing a mentoring series that would provide students with solid professional contacts and relationships in the field, the Primary Person Model (which involves connecting a student with an advisor who offers ongoing coaching, guidance, and career advice) was utilized for the first year of the program (cohort 1). Staff members interested in becoming a

mentor participated in a training class to learn about mentoring best practices. As often as possible, students were paired with professionals who had similar career goals, interests, and hobbies. Matches were made through the use of a modified personality survey that was administered to both students and mentors online. Some examples of questions included: "What are your hobbies?" "Where do you see yourself in 10 years?" "What are your career goals?" and "What were your career goals when you were in high school?" Once linked, students and mentors were encouraged to communicate through email, phone calls, text message, and to schedule mentor meet ups.

Bridging the Gap's year 1 evaluation indicated that students benefited greatly from the mentoring program, with a mean rating of 4.2 out of 5 for the statement "Overall the mentorship assistance was helpful," and 4.4 out of 5 for "My mentor(s) is willing to give me advice and answer my questions." However, when probed about the status of the mentoring program and their relationship with their assigned student, some mentors did not share the same sentiments. Although this approach seemed the most promising for the needs of the program, cultivating a natural mentor/mentee relationship proved difficult through this method as communication style, comfort level, available resources, and/or time varied from one participant to the next. Some mentors felt as if their relationship was one-sided, with the mentor frequently initiating conversation and then waiting for a timely response from their mentee. Others believed they lacked the ability to find common ground, and, as a

result, interactions with mentees felt forced and uncomfortable. Additionally, since the program did not require regular in-person interactions, some mentors felt out of touch with their mentees.

With this in mind, WCS adopted a community-centered mentoring model that eliminated the need for a one-on-one mentor/mentee assignment. With this model, both professionals and students had the opportunity to interact with each other in a group setting, with scheduled in-person mentor sessions held at the zoo afterschool. Through the use of hands-on activities and discussion topics that were designed to strengthen the bond between students and professionals, the pressure on any one party to force a relationship that would not have developed organically given different circumstances disappeared. As a result, both mentors and students were able to build relationships with all participants instead of a select few.

The community mentoring sessions were conducted once a month during after-school hours at the Bronx Zoo, Central Park Zoo, Prospect Park Zoo, Queens Zoo, and the New York Aquarium (eight times per site and cohort for ninety minutes). On average, four to seven mentors and ten to twenty mentees participated. Students from Cohorts 1 and 2 were also invited to attend. Group activities during the eight sessions included creating vision boards (collages with images that represent long-term and short-term goals), discussing future career plans, and participating in role playing sessions with WCS professionals to learn valuable interviewing skills.



Evaluation data for the second year displayed a slight rise in student approval with a mean rating of 4.5 out of 5 for the statement, “Overall the mentorship assistance was helpful,” and 4.6 out of 5 for, “My mentor(s) are willing to give me advice and answer my questions.” Despite these improvements, staff feedback suggested that the activities felt too structured and did not allow for a natural flow of conversation between the mentors and students. They indicated a need for more conversation and less activity-based engagement.

During BTG’s third and final cohort, the curriculum was amended to allow time for small group discussions and relationship strengthening. There were fewer planned activities and more time for conversation to flow between mentors and mentees. Final evaluation data was not available at the time of this publication. However, students appeared to be engaged during sessions and a large number of students from all three cohorts participated in mentoring sessions. Additionally, staff satisfaction with the Community Mentoring Model is high. Some staff members who have participated in all three BTG cohorts have expressed that this model works well for them. They indicated having a higher level of satisfaction in terms of what they could offer the students and also felt that this model allowed them to rely on others, who had diverse experiences, in order to effectively meet the varied needs of the students.

### **Moving Forward**

Deploying a community mentoring program that seeks to change in the lives of underrepresented high school students not only requires careful planning but also demands flexibility, understanding, dialogue, and focus from all involved. The adaptation of a Community Mentoring Model, with an emphasis on dialogue, has allowed WCS to best use the strength of our professional staff to support Bridging the Gap students in a way that takes into account the unique needs of this population.

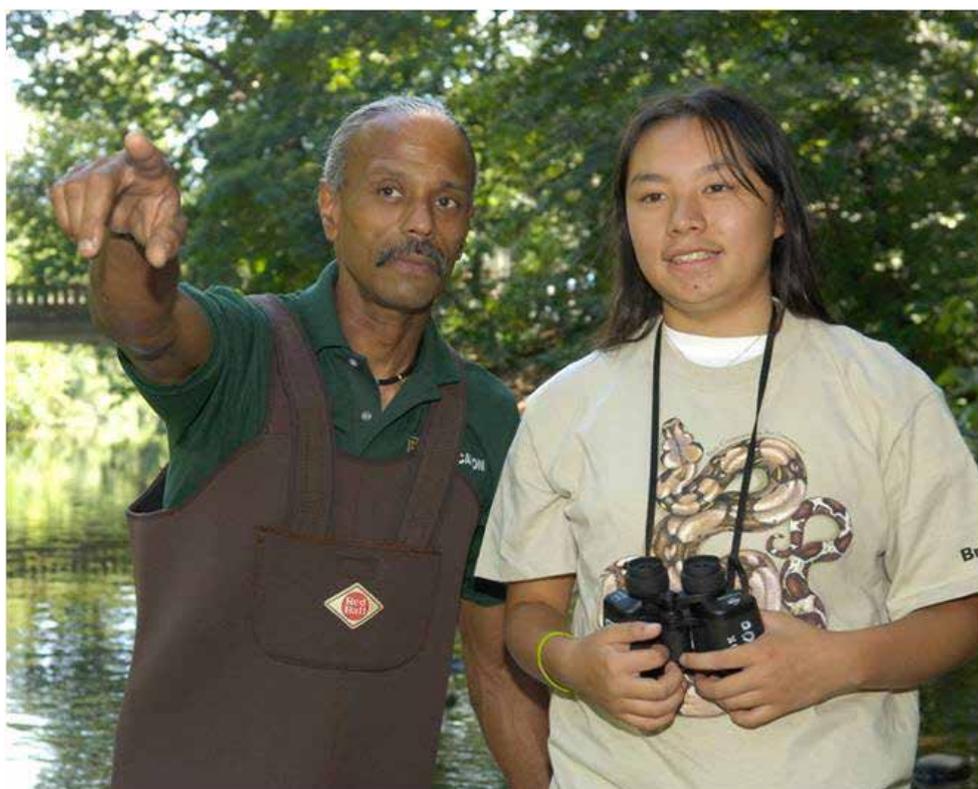
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# Assessing 37 years of success of the IZE journal: a bibliometric approach

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Education is a very important aspect of zoo operation, it is even considered one of its substantial objectives and a core to their mission (WAZA, 2005). However, the educational value of these institutions may have been misunderstood, generating the false perception that the educational purposes equate its results (Moss and Esson, 2014). The evaluation of educational programs is the only way to identify the educational reaches of our institutions, know whether our programs are working, find what our visitors know and think, make the most of the educational resources, prove reliable information to make improvements and provide evidence of success (Esson, 2013). An adequate evaluation will lead us to understand the universe of factors which determine its impact.

A critical reflection on any formal discipline requires considering all the components of the scientific phenomenon, analyzing its dimensions and contexts, which do not conclude with the publishing of results on scientific articles but transcend the value of its impact not only on the scientific but on the social scope.

Science started to consider the process of 'production of science' since the second half of the twentieth century; in other words, the many ways in which science is developed and directed towards the understanding of methods and objectives of investigation. This date coincides with the development of technology which takes us to consider the importance of its contribution in the generation of science (Echeverria, 1998).

In this sense, it is important to highlight the use of new technology since 1950, when it started a swift development. The adoption of the use of computers and the access to the internet, influence all aspects of human life. Science is no exception and it relates especially to development of technology (Michán, 2011).

It is clear that science is not developed, produced, published, spread and used the same way as it was 50 years ago (Macías y Michán, 2009).

Bibliometrics is defined as the study of knowledge, based on the quantitative analysis of the production and impact of literature.

Bibliometric analyses were facilitated by the development and use of databases; they consist of

a group of records of bibliographic publications with the objective of grouping them for storage, analysis, processing and consultation of the information they contain.

The resulting databases contain the data and metadata of the bibliographic publications, organized in a precise and standardized order, also offering the benefits of storing a great quantity of structured information in very little space, this information becomes accessible through the use of search engines and is adapted to the needs of the user, allowing the processing of data and easy update using the adequate software.

As an example, I present the bibliometric analysis performed with the records from the journal of the International Zoo Educators Association (IZE) - an excellent resource for articles on conservation, environmental interpretation, zoo education, methodology, techniques and evaluation. It issues a yearly edition generated by the IZE editor and one hard copy is sent to the members of the association while the electronic version is published on their website (IZE, 2015).

The articles that have been published in this journal were used as object of analysis, through which the data and metadata were constructed for each of the records. Note for this analysis, articles by the president, editor and secretary, as well as the reports or applications for membership were not included. For the creation of the records, the Dublin-Core scheme was used in order to ensure that they met with the international standards which allow to guarantee the interoperability of this database.

To carry out the bibliometric analysis, the bibliometric indicators were chosen which were also analyzed to obtain results and perspectives. The bibliometric indicators that were used were production, author, collaboration and impact (Fig. 1, right).

The collection consists of 777 records published in 50 numbers through 37 years (from 1977 to 2014).

The first indicator (production) was analyzed for the most frequently found words in the titles of the publications, with which a word cloud was built, showing that the articles are clearly oriented towards the topic of conservation education



Kingdom, however Europe is the second most productive region due to the sum of production per country in this continent. While the most developed countries have a higher number of articles, the list of most productive countries does include some in development such as India, South Africa and Mexico.

Concerning the third indicator, which is collaboration, it was determined that there is collaboration between educators within the same institution, among institutions in the same country and between countries of the same region, but more importantly, though it represents a minimum of the publications, it was detected that there is collaboration among different regions which is significant due to the difficulty this involves.

The region with the most collaboration is North America, which has presented work with each of the other regions.

The fourth indicator is impact, for which the use of references was considered and it was determined that 68% of the articles do not have any references. However, in 2014 the highest number of references in one journal was registered, so the tendency to use references is on the rise.

The results of this work show that the IZE association is fulfilling its mission of improving the education programs in the facilities of its members and providing access to the latest thinking, techniques, and information in conservation education (IZE, 2015).

The generated bibliographic collection represents another resource which zoo and aquarium educators can access to obtain relevant information for the development of its programs and for their evaluation, considering the previous experiences from other similar institutions.

The perspectives for this work are: to continue the curatorial process of this collection and update it yearly with the issuing of each new number; create a how to cite section; promote the use of references in the publications; enrich the collection with hyperlinks to the full-text documents for all the records; consider the creation of an institutional repository to make this collection as well as the full-text documents accessible to all IZE members; and most importantly, to adopt international standards for the use of bibliographical data.

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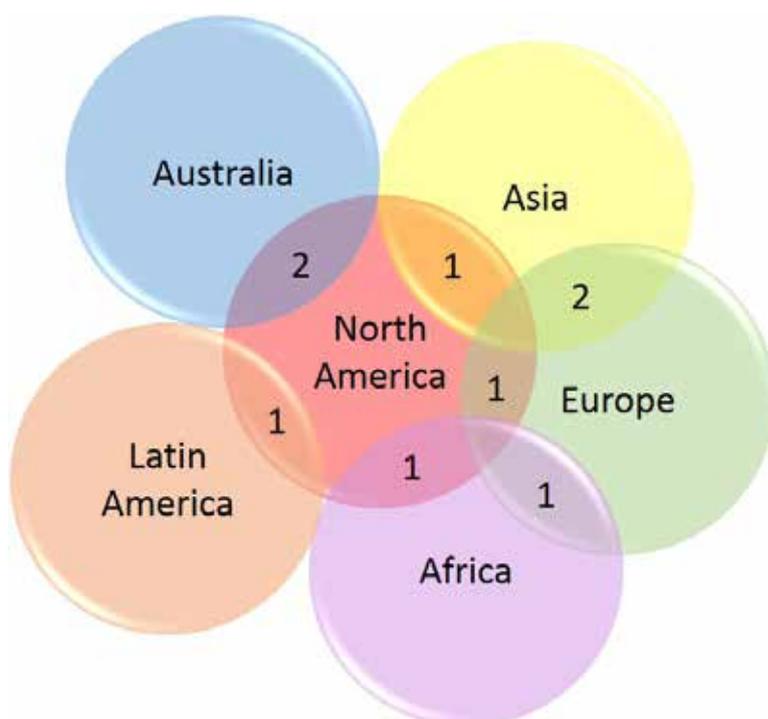
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*Note: This article has been edited. For more details and information on this analysis please contact the author.*



# Can Anthropomorphism Help Save the Leadbeater's Possum

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## Abstract:

*When presenting conservation messages, the use of anthropomorphism has been intensely debated. On the one hand, it has been argued that attributing human characteristics to wild animals could create misconceptions of a species' natural history and ecological role. However, from the standpoint of interpretation, anthropomorphism can be a useful tool to help foster a connection to wildlife, which has been shown to strongly correlate to pro-conservation behavioral intentions. This paper discusses the role of anthropomorphism in Zoos Victoria's Lunar's Secret Forest exhibit and its affect on behavioural intentions. Results show visitors were able to attribute human characteristics to Lunar – an anthropomorphized Leadbeater's Possum (*Gymnobelideus leadbeateri*), as well as live Leadbeater's possums. In both instances, anthropomorphism was related to visitors' emotional connection to and willingness to act on behalf of Leadbeater's Possums.*



As zoos continue to grapple with what it means to be a wildlife conservation agency in the 21st century, they are forced into a form of managerial triage. Issues of engaging visitors, improving long-term conservation, and animal exhibition all vie for strategic priority. Flagship species are one outlet for this building pressure. Flagships rely on species' charisma, interpretation, and actionable conservation outcomes. When put into practice this produces a strategic communication campaign focused on a specific animal with realistic actions for visitors to perform (Skibins, 2014).

A key issue for successful flagship campaigns is the animal itself. In general, species with higher levels of charisma (i.e. overall attractiveness to the public) are able to generate results more easily and quickly. Higher charisma also tends to improve public recognition of the species and its conservation plight. More recently, charisma has been studied for its ability to foster a connection within zoo visitors. Visitors' emotional connection to zoo animals is highly predictive of their willingness to perform pro-conservation behaviours for that species (Skibins and Powell, 2013).

However, charisma is highly variable and may not be as strong in species most in need of public support. Another way the public may connect to a species is through anthropomorphism. Anthropomorphism is the attribution of human characteristics to non-human entities. As places where people and animals meet, zoos are arguably the most accessible means of building a connection between species. We see a gorilla cuddle her baby and think of ourselves or our own mothers doing the same; we observe meerkats lazing in the sun while their sentry stands guard, perhaps reminiscent of the Guards of London Palace. We watch two little tamarins grooming each other and snuggling close; and it sparks that thought of your best friend who knows everything about you and loves you, fleas and all.

By helping visitors relate to an animal, anthropomorphism could increase levels of care for that animal (Smith and Sutton, 2014). The relationship between relatability and care has been shown to positively influence levels of social inclusion, rights, and concern (Opatow, 1993). This would suggest that anthropomorphism could be a useful tool for zoos to incorporate in developing flagship campaigns. In fact as many zoos move towards zoo-based conservation, it is critical to build care for animals on the brink of extinction and facilitate visitor actions that will make a positive difference to wildlife. This can also provide a mentoring approach to future generations so they grow up with a love and respect for animals that previous generations may not have felt as deeply.

Zoos Victoria works with 20 of Southeastern Australia's

most endangered animals. From the Baw Baw frog that spends most of his life underground, on his back in a pool of slime to the Leadbeater's Possum that flits fairy-like through majestic hardwood forests, the zoo has a profound respect and desire to help each of them. But let's be honest; many of visitors can find it hard to relate to these species that are small, brown and blend so perfectly with their surroundings that one may have no idea they even exist. This is why the three Zoos at Healesville Werribee and Melbourne have started to experiment more and more with anthropomorphism. Zoos Victoria sees it as one of the most powerful tools in their fight to save species from extinction.

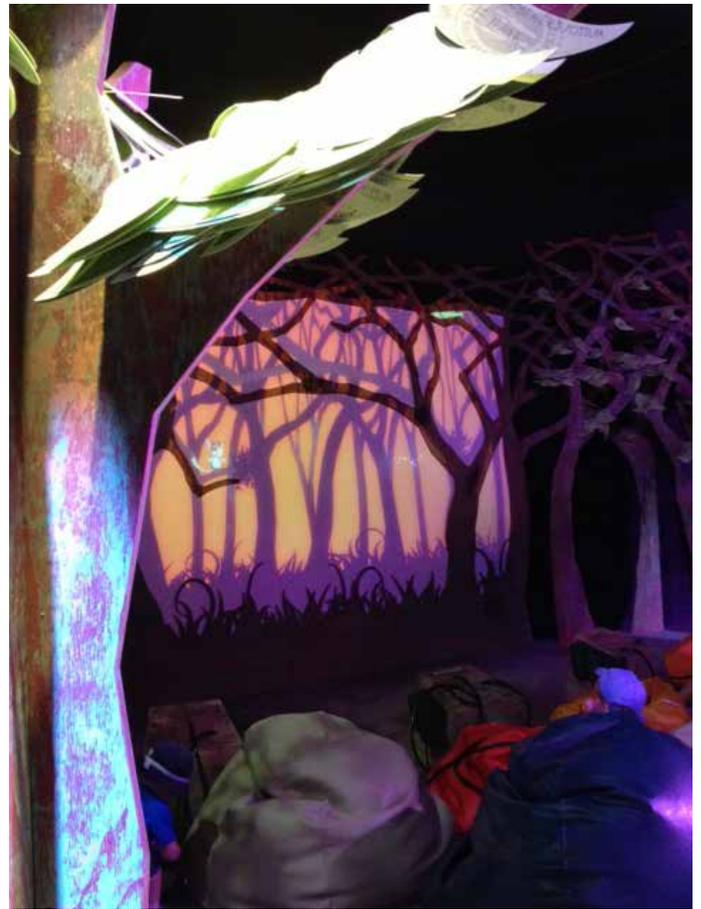
But how do you employ anthropomorphism with a species that may not actually be able to exhibited within a zoo? In June 2012, Zoos Victoria opened Lunar's Secret Forest at Healesville Sanctuary to engage visitors in the plight of the State's endangered faunal emblem. The interactive exhibit depicts a cartoon character Leadbeater's Possum, Lunar, and asks children to follow her on an interactive 'stag watch' that depicts Lunar's fellow wildlife as well as the threats to her survival. Use torches, children can shine a light on aspects of a screen on which Lunar appears. [See also IZE Journal 50 pp.31-34]

The Lunar's experience was complemented almost a year later with the arrival of two live Leadbeater's Possums in the Sanctuary's revamped Nocturnal House. As a species that is on the brink of extinction and, as the State's faunal emblem, we wanted to test our use of anthropomorphism and whether it had a positive correlation to visitor's willingness to act to protect the species.

The study used a mixed methods approach to evaluate the affects of using anthropomorphism in interpretation and its impact on conservation efforts for the Leadbeater's Possum. Qualitative interviews were conducted to explore visitors' perceptions of anthropomorphized portrayals of Leadbeater's Possums. Interviews examined themes of trait attribution, portrayal preferences, willingness to act, and linkages to a live animal. Quantitative surveys were collected to analyze relationships between anthropomorphism, care, and willingness to act. Additionally, comparisons were made between the experience in Lunar's Secret Forest and the live animal exhibit to determine if visitors could anthropomorphize a real animal.

### **Visitor Perceptions of Lunar**

Anthropomorphism has been proposed as a tool to increase conservation action when it heightens perceptions of similarity with the animal. Perceiving an animal as more similar to you, in theory, makes it more relatable, leading to a greater willingness to take conservation actions. In order to better understand the role of anthropomorphism



in interpretation, it is important to first understand the ways in which visitors compare themselves with animals.

One trend that emerged regarding perceptions of similarity was with appearance and physical features. The most commonly mentioned physical features used to assess similarity related to appendages (e.g. hands, fingers, arms, legs, and feet), eyes (e.g. the size and artistic representation of them), and posture (i.e. how they stand). Other commonly mentioned criteria were similarities of thinking, feeling, and doing. However, the specific types of things visitors felt Leadbeater's Possums think, feel, and do varied. The most commonly mentioned factor for determining likability was cuteness.

When visitors were presented with an inanimate object, with no additional information, the primary way they drew comparisons was based on physical appearance. Secondary comparisons were made in terms of attributing thoughts, feelings, and actions. Additionally, visitors struggled to identify a portrayal as a Leadbeater's Possum, or link it back to the photo of the actual animal. This was in part because few people knew enough about Leadbeater's Possums to be able to identify one on their own.

A commonly mentioned reason as to why people were willing to take actions to help conserve Leadbeater's possums was because they liked the anthropomorphized portrayal and/or the species. This suggests that willingness to take conservation actions can be maximized by finding ways to portray

a species in a way that makes it likable to your target audience. Most adults interviewed, reported having a greater connection with and preferring to view photos and/or the actual animal, as opposed to anthropomorphized portrayal.

### **Relationship Between Anthropomorphism, Care, and Willingness to Act**

This phase of the study investigated if the anthropomorphized character Lunar could affect visitors' emotional connection to Leadbeater's Possums and willingness to perform pro-conservation behaviours. Additionally, we sought to compare the results from Lunar with that of seeing a live Leadbeater's Possum. A total of 297 surveys were collected from visitors to Healesville Sanctuary in 2014. Visitors were asked 22 questions regarding how behaviours, physical appearance, and emotions affected their perceptions of Lunar or a live Leadbeater's Possum. They were then asked to evaluate their level of connection (Conservation Caring) and willingness to perform conservation actions for Leadbeater's Possums.

Visitors attributed two types of human characteristics to Lunar and live Leadbeater's Possums, likeability and similarity to human experiences. Visitors reported a higher likeability for a live Leadbeater's Possum and higher degree of similarity to human experience for Lunar (Table 1). Both factors were significant predictors ( $p < .05$ ) of Conservation Caring; which in turn, was a significant predictor ( $p < .05$ ) of willingness to act. Comparing scores for

Table 1: Mean scores for anthropomorphic traits, Conservation Caring, and willingness to act

Factor	Representation	Sample Size	Mean	Standard Deviation	Standard Error
Likeability	Lunar	118	8.12*	1.00	0.092
	Live Leadbeater's Possum	103	7.62*	1.23	0.12
Similarity to Human Experiences	Lunar	116	5.97*	1.62	0.15
	Live Leadbeater's Possum	106	7.02*	1.66	0.16
Conservation Caring	Lunar	117	5.78	1.91	0.18
	Live Leadbeater's Possum	108	6.10	1.52	0.15
Willingness to Act	Lunar	114	5.06	1.84	0.17
	Live Leadbeater's Possum	100	4.97	1.76	0.18

\* indicates mean scores are significantly different at  $p < 0.001$ . All scores range from 1 (strongly disagree) to 9 (strongly agree).

Conservation Caring and willingness to act between Lunar and a live Leadbeater's Possum revealed no significant differences (Table 1).

This phase of the study supports the positive impact an anthropomorphized character has on visitors' ability to connect to a live animal, and ultimately act on its behalf. Visitors indicated their ability to draw parallels between Lunar's daily life and human experiences and a live Leadbeater's Possum's likeability both significantly influence Conservation Caring. These findings support the role of anthropomorphism in future interpretive strategies. Additionally, zoos could explore how animated characters can serve as interpretive linkages to elusive or less popular species.

Lunar and the visitor experience within Lunar's Secret Forest demonstrate that a highly anthropomorphized animated character can be an effective segue to care for non-traditional and/or secretive zoo species. As Leadbeater's Possums are nocturnal, small, and quick, they are often out of sight within the exhibit. Lunar can be an effective substitute to create a connection and drive behaviours within visitors who fail (or choose not) to observe a live animal. This strategy could be replicated across several species. Particularly, those species that share the same exhibiting challenges as Leadbeater's Possums or who fail to hold widespread public appeal, such as insects and snakes. In so doing, zoos could extend flagship status to a wider array of species, and make greater contributions to wildlife conservation.

### Conclusion

The relationship between anthropomorphism and conservation actions is indirect. Anthropomorphism is expected to influence action to the extent that it is able to blur the boundaries and heighten relatability between self and animal. Relatability is linked to concern, which can lead to an increased willingness to take conservation actions for a species.

Visitors' perception that Lunar experiences the world in a way that is similar to humans was predictive of Conservation Caring, which influenced

willingness to act for Leadbeater's Possums. These findings suggest that an anthropomorphized character could be used as a surrogate for lesser known, and/or harder to spot animals. However, it is important to note that the ability of anthropomorphism to heighten conservation actions may be limited to the extent that a person is able to link the anthropomorphized character back to the actual species.

When interviewed, most adults reported difficulties linking representations back to Leadbeater's Possums. This was because many visitors reported they were completely unaware of the species. In order to facilitate the link between representations and the actual animal it is recommended that anthropomorphic design elements and interpretation messages make explicit linkages to the species. Recommended strategies include: providing information about the species' appearance and behaviours, and creating representations that more closely approximate the species.

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# The Nature of Interaction Between Zoo Docents and Visitors and the Use of Inquiry

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## Abstract

*Zoo docents influence how visitors engage with zoo exhibits and programs and develop their own scientific thinking. This study explored the nature of interaction between docents and visitors at Woodland Park Zoo located in Seattle, WA in the context of inquiry based teaching and learning. Results show that increased use of open-ended questions can lead conversations between docents and visitors to a greater level of visitor inquiry, engagement, and cognition.*

**Editor's Note:** *The term 'docent' is widely used in the North American context. Elsewhere the role of docents may be most closely that of 'volunteers', however this may also include: 'presenters' and/or 'explainers'*

## Introduction

Docents are one of the best attributes a zoo has to build a connection between guests and zoo animals (Fraser and Wharton 2007). These front-line educators influence guest experiences by modeling desirable science learning behaviors, helping guests to develop and expand scientific explanations, and shaping how guests interact with science, with one another, and with educational programs and materials (National Research Council 2009). As the body of research grows on how learning occurs in free-choice institutions, it is important for zoos to keep their docents up to date with current ways of teaching and interacting with visitors.

An important strategy for learning in a free-choice institution is the use of inquiry. This type of learning promotes the asking of questions and is designed to encourage guests to delve deeper into their questions and come to their own conclusions. Inquiry also helps visitors to make connections to events in their own lives and gives them ownership of their learning (Llewellyn 2007).

The objective of this study was to obtain a clearer understanding of the nature of interaction between docents and visitors at Woodland Park Zoo in the context of inquiry based teaching and learning. The primary method was to analyze subtle docent/visitor conversations in order to characterize the content and nature of learning taking place, referred to as "learning-talk" (Allen 2002). Rather than focus on the outcomes of docent/visitor interaction this study focused on the interaction itself. Specifically, this study examined the extent to which the tools of inquiry are being used in these interactions and the

impact of the use of inquiry on the interaction when used or not used. The following research questions were developed.

1. What is the nature of conversation between zoo docents and zoo visitors?
2. To what extent is inquiry being used during these interactions?

## Methods

This study was designed as an unobtrusive observation of docent interactions with visitors at Woodland Park Zoo from November 2013 through February 2014. The study focused on the zoo's docent-run Animal Encounter Program (AEP), which provides guests with an up-close, hands-on, interpretive experience with the zoo's live collection of education animals.

A coding scheme was used to record instances of learning talk, modeled from Sue Allen's work "Looking for Learning in Visitor Talk: A Methodological Exploration" (2002). This coding scheme presents a hierarchical approach to coding conversation with six main categories and 12 subcategories of learning talk (Figure 1). Categories and subcategories with an asterisk were added or adjusted to Allen's (2002) original scheme in order to fit this study's particular situation as well as research questions.

Categories of perceptual, conceptual, and connecting were ranked in level of cognition. The category of perceptual can be thought of as a basic level of cognition, such as simple naming of animals. The next level of conceptual represents a slightly higher level of cognition including utterances that are

<u>Perceptual</u>	<u>Conceptual</u>	<u>Connecting</u>	<u>Affective</u>	<u>Open-ended Question*</u>	<u>Close-ended Question*</u>
Identification	Simple	Life-connection			
Naming	Complex	Knowledge connection			
Feature	Prediction	Inter-exhibit connection			
Quotation	Metacognition				
Instructions*					

Figure 1

simple interpretations of animals (e.g., where they live or what they eat), or more complex levels of interpretation such as generalization about animals or relationships between objects and animals. This category also includes the act of metacognition or reflection on one's own state of knowledge. The third and highest category of connecting includes explicit connections between an aspect of the AEP and some other knowledge or experience beyond this activity, for example, the act of using the program as a stimulus to share a personal story, previously learned information, or a link to another exhibit (Allen 2002).

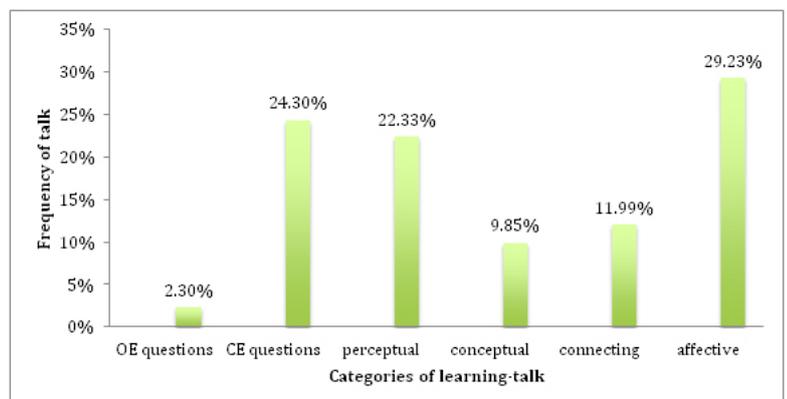
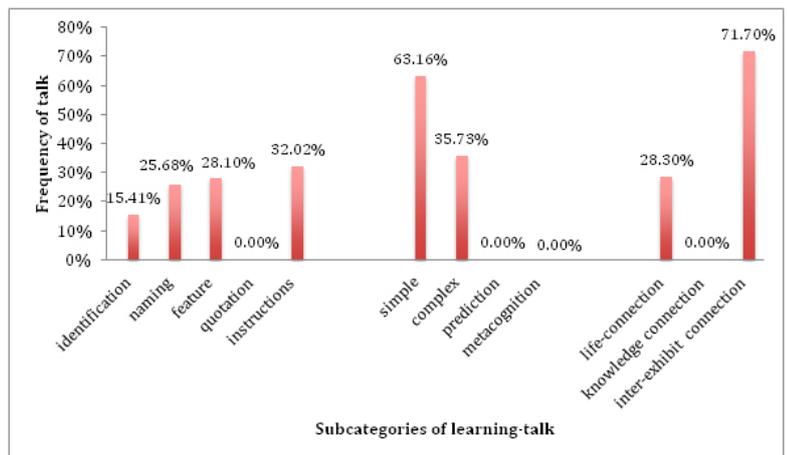
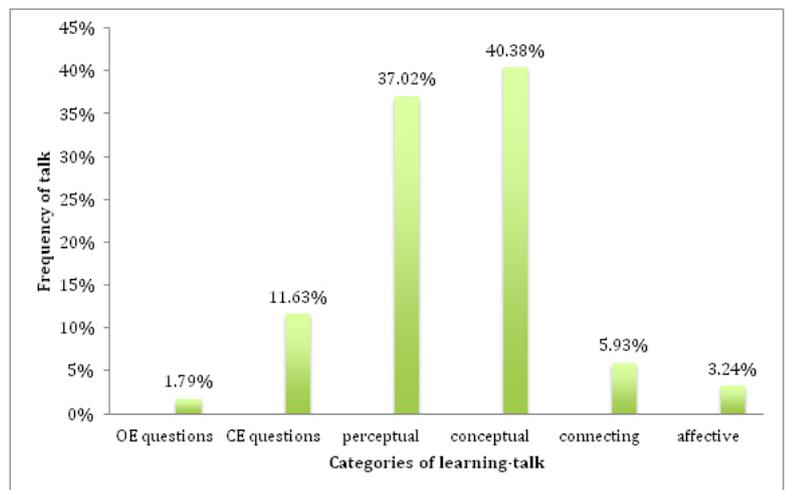
Categories of open- and close-ended questions were added in order to capture a key aspect of inquiry that occurs during docent/visitor interactions. Open-ended questions were defined as questions that constituted an answer that included an explanation more than a "yes" or "no." Close-ended questions were defined as those answerable by a simple "yes" or "no" reply. The subcategory of "instructions" that falls under the category of perceptual talk was also added into this study because of the nature of the AEP program, which includes hands-on participation. For example, instructional talk might represent talk such as "touch with two fingers only" or "make sure to wash your hands after touching."

This study recorded the frequency of instances of learning-talk from both the docent and the visitor. During the study period a total of 16 docents were recorded, which represents approximately half of the 34 docents trained in the AEP program. A total of 49 groups of visitors were recorded which totaled 120 individual visitors.

## Results

Results were first looked at separately between docents and visitors. Docents did most of the talking during conversations recording a total of 894 utterances (59.48% of total talk by docents and visitors). The most common categories of talk by docents were conceptual, perceptual, and close-ended questions (Figure 2). The least common categories were connecting, affective, and open-ended questions.

Next the categories of perceptual, conceptual, and connecting were broken down into their subcategories to take a closer look at the frequency of talk by docents (Figure 3). Within the subcategory of perceptual talk docents had the highest frequency of instructional utterances, followed by feature, naming, identification, and quotation. Within the subcategory of conceptual talk the highest frequency of talk was in the simple category, followed by complex, with prediction and metacognition both not occurring. In the subcategory of connecting the highest frequency of talk by docents was in the subcategory of inter-



**Figure 2.** Frequency of talk in each main category of learning-talk for docents; **Figure 3.** Frequency of talk by docents within subcategories of learning-talk; **Figure 4.** Frequency of talk in each main category of learning-talk for visitors.

exhibit connection followed by life-connection, with knowledge-connection nonexistent.

Of the total number of questions asked by docents, 86.67% were close-ended and 13.34% were open-ended.

Next this study looked at frequency of talk in the same categories of learning-talk by visitors (Figure 4). Visitors recorded a total number of 609 utterances of learning-talk (40.52% of total talk by visitors and docents). The most common categories were affective, close-ended questions, and perceptual. Least common categories were connecting, conceptual, and open-ended questions.

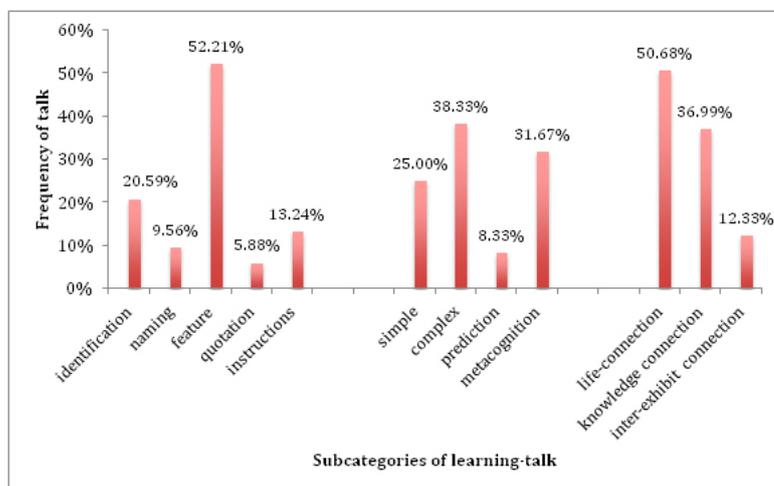


Figure 5. Frequency of talk by visitors within subcategories of learning-talk

To provide a closer look at the frequency of talk by visitors, the categories of perceptual, conceptual, and connecting were again broken down into their subcategories (Figure 5). Within the subcategory of perceptual talk visitors had the highest frequency of feature talk, followed by identification, instructional, naming, and quotation. Within the category of conceptual talk visitors engaged most in complex talk, followed by metacognition, simple, and prediction. Within the category of connecting the highest frequency of talk was in the life-connection subcategory, followed by knowledge-connection, and inter-exhibit connection.

Of the questions asked by visitors, 91.35% were close-ended and the remaining 8.64% were open-ended questions.

Using SPSS statistical software, a cross-tabulation analysis by question type showed that when open-ended questions were asked by either docents or visitors, significantly more utterances in the following categories of learning-talk occurred: conceptual ( $p=.001$ ), complex (subcategory of conceptual) ( $p=.001$ ), and connecting ( $p=.041$ ). When close-ended questions were asked, there were significantly more utterances in the identification subcategory of perceptual ( $p=.003$ ). Confidence levels for tests of statistical significance were set at 95% ( $p<=.05$ ).

## Discussion

Docents observed as part of this study engaged most in conceptual talk, but within conceptual talk most utterances were in the subcategory of simple interpretation usually in response to close-ended questions. This can be expected of docents, as most conversation is about where the animal lives, what it eats, and how old it is, for example. Docents also spend a lot of their time engaging in perceptual talk with the highest frequencies in instructional and feature talk. This can also be expected of docents due to the nature of the hands-on program and the importance of visitor and animal safety. Most of the

feature talk done by docents was an attempt to engage the visitor in a specific animal, such as drawing their attention to a certain physical or behavioral aspect of the animal.

Subcategories that had frequencies of 0.00% by docents were quotation, prediction, metacognition, and knowledge connection. Although these categories are possible for docents to engage in, they are not likely to do so because of the nature of the subcategories. Docents are not likely to read from a sign, reflect on their knowledge, make a prediction, or make a connection about something they already know.

These subcategories are more likely to occur within visitors while learning new information.

Visitors engaged most in the affective category. This kind of utterance was observed most in response to a docent talking with expressions of surprise, laughter, or sympathy, for example. The second category of visitor engagement was close-ended questions. This is also very typical of visitors who ask simple questions about the animal. Another subcategory noted was the high frequency of feature talk by visitors. This was seen most when visitors pointed out a specific aspect of an animal. The subcategory of life-connection also had a high frequency of utterances as visitors often told stories about how they had a pet or knew someone who had a pet that was similar to an animal featured in the AEP program.

Although the category of affective was present in both docent and visitor utterances, because of the complex nature of affective feelings, this category was not broken down into subcategories and was only recorded in order to record completion of the conversation. In order to further investigate the category of affective in the context of inquiry, the order in which utterances occurred would need to be recorded to determine what specifically provoked the affective utterance.

Results of this study indicate that in order to engage visitors as well as docents further in inquiry it is important to increase the frequency of learning-talk in the higher levels of cognition. Realizing that inquiry as well as learning in general is a continuous process, it is important to include all of the required steps in order to create an effective learning experience. Key to this process is to increase the use of open-ended questions. It was found that docent or visitor use of open-ended questions was more likely to increase the frequency of conceptual and connecting categories of thinking which are the second and third highest levels of cognition. More specifically, open-ended questions were found to increase the likelihood that the frequency of the complex subcategory occurred which engages in drawing inference beyond simple interpretation.

Another interesting aspect of this study is that the one category that both visitors and docents engaged in the least was open-ended questions. Yet, even with such a small frequency of open-ended questions we are still able to see the significant positive impact on learning-talk. According to Edwards and Bowman (1996), improving questioning strategies may lead to the development of higher cognitive skills.

It is also important to note that no significant difference was found between whether a docent or a visitor asked the open-ended question. While teaching docents how to ask open-ended question can improve their interaction, teaching them how to get visitors to ask open-ended questions is equally important. When people ask and answer their own questions it helps them clarify their thinking, construct ideas, and form theories about the world around them (Astor-Jack, Keihl Whaley, Dierking, Perry and Garibay 2007).

### Conclusion

Overall, the visitors and docents at Woodland Park Zoo engaged the most in the basic level of cognition and had a downward trend for the next two levels of cognition. This is a typical expectation of learning-talk as the ease of talk is seen most in lower level thinking and becomes more work as the level of cognition increases. The cross tabulation results demonstrated that asking close-ended questions results in lower level cognitive learning-talk, but when open-ended questions were asked by either party the level of cognition jumped to the next two highest levels of cognition. The process of engaging in improved questioning can lead conversations between docents and visitors to a greater level of inquiry. It is important to note that although the use of close-ended question resulted in more basic level cognition, this level of cognition should not be viewed as undesirable. Inquiry is a process of thinking and requires the basic level of cognition to build upon in order to achieve the higher thinking.

### Acknowledgements

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# Education Programs – Not just for our Visitors

Grant Aggett-Cox

Umgeni River Bird Park, Durban, South Africa

The World Zoo and Aquarium Conservation Strategy recommends that zoos and aquariums endeavour to develop structured training programmes available to all staff and volunteers. (WAZA (2005): Building a future for Wildlife – The World Zoo and Aquarium Conservation Strategy). Whilst the Umgeni River Bird Park management has made this document compulsory reading for all management staff, the training of the staff at this facility were neglected in the past. Previous managers and directors focused on educating the visitors of this park and assumed that the staff either knew all they needed to, or didn't need to be educated more as their true value was not fully appreciated. This started to change in 2012 with the appointment of a full-time education manager and also a new general manager. One of the training initiatives was that I was fortunate to be elected as a sponsored delegate in 2014. At the same time, new conservation education programmes have been developed, for example the creation of an organic vegetable garden in the park using compost created from organic matter we used to send to a land-fill site. The staff training initiatives as well as the progression in the conservation education programmes at Umgeni Bird Park are discussed in this paper.

In September 2014 I presented a paper at the 22<sup>nd</sup> Bi-annual International Zoo Educators Association Conference in Hong Kong entitled Staff Education – the Key to Successful Education Programs. Little did I know when I was preparing that presentation that the problem I thought I was alone with was actually a reality in many facilities around the world. Whilst we may like to think that our staff are properly

trained, the reality is that we have missed a few steps along the way in our training. At our park, previous management did not fully appreciate the importance of having well-trained staff and therefore neglected to train them properly. There was also a line of thinking that trained staff would require higher salaries. The reality though is that having well-trained staff has saved us money in the long run. In the process our birds receive a higher level of care and attention than previously which leads to healthier birds and improved enclosure standards. We have found through this process that our staff are not only willing to learn, but eager to know more about the birds in their care.

Our current staff training program does not only cover our parks policies, procedures and animal care, but also includes practical training our staff can use in their home lives as well. We offered fire-fighting training to our staff and found that it was mostly our female staff who were most interested in attending. This was interesting for us and after asking, we found that a number of them come from lower-income housing areas where fires are a common occurrence due to paraffin and candles often being used indoors. As they were also the people doing most of the cooking at home, they thought it would be a good idea to learn how to control a fire in their home areas as well as in our park. They have also spread this knowledge to their neighbours and helped educate them as well.

In the same way, almost all our staff has signed up over the last two years to do our first-aid course. Whilst this ensures we always have three first-aiders on duty at any time, like the fire-fighting course,





this is something they are able to use in their own home environments. When looking at our staff training program for the year, we take into account not only programs that will be of benefit to our park, but ones that will also benefit the staff in their own lives. This year we have also drawn up separate training programs for different staff sections in our park. These sections include keepers, maintenance, show staff, management, curators and education staff. This split will allow us to focus on areas that are specific to each department and ensure that we have an effective training program.

One of our largest programs for 2015 is the establishment of an organic garden in the park. We are lucky to have a large piece of land in the park which was previously operated as a nursery for many years before being closed down. This land has been open since 2012 and we have discussed many options for using it over the years. In September 2014, after returning from the IZE conference, I was inspired to start a compost heap using the organic material which used to be sent to a landfill site for disposal. My general manager was very enthusiastic and two weeks later the ground had been cleared and we started preparations for the compost bins. In seven months, we reduced the amount of material going to the landfill site by more than 50 cubic metres and around 2 tons of waste! As well as plant material, there is also a separate compost area for meat waste. Once both heaps have decomposed for 3 months, they are mixed together and the resulting compost is being used in our new herb and vegetable garden. The growth of plants in this garden has been phenomenal and exceptionally fast. The first plants we established in February 2015 and in just over a month we are already harvesting the first crops

from plants that should take two months to produce fruits. There are currently 30 species of herbs and vegetables being trialled in this garden and we use no poisons at all to control pests. Through this we have been teaching the staff about the importance of recycling, composting, organic gardening and also how to grow their own vegetables at home. This program has been very successful with all the staff taking an interest in the garden and also requesting seedlings to take home to plant in their own gardens. As well as using produce from this garden in our park to reduce the need to purchase from suppliers, surplus will be donated to a local school to use in their feeding program for their children. This school will also be invited to come to the park at no charge not only to see the garden, but more importantly to teach them about the park, birds and conservation.

In addition to on-site training, we have plans this year to take all the staff on excursions to other facilities in our area. This exposure we hope will not only give them ideas on what can be done in our own



park, but also give them an opportunity to interact with other staff in the zoo industry and allow them to share ideas and establish relationships. This is one of the most important things that attending the IZE conference did for me and I know the relationships and friendships I made there have changed my life. Having a limited budget or manpower does not mean that we have an excuse not to do more training with our staff. For us it has been the incentive to find ways of training that can be done in-house, or adapted into an existing program. Our staff are our biggest assets and it is time we remember that and do everything we can with what we have to educate and train them every way we can for their own benefit and the benefit of our facilities.

At the beginning of 2015 our park undertook an Operational Standards Audit conducted by PAAZA (Pan African Association of Zoos and Aquaria). We had been planning for the audit since 2013 but were still nervous about meeting the criteria. Admittedly our biggest concern was whether our staff would remember all we had been teaching them for the past two years. We had nothing to fear. Not only did we pass the audit with flying colours, it was even commented that our staff could not be faulted and that all their answers and work ethics matched to the extent we were asked if we had given them a script beforehand! Whilst this may not sound like a big deal to many people, it showed us that the hard work and time we had invested into the staff was more than worth it.

None of this though is possible without the support of our directors and section managers. At the same time, they have often been the hardest people to convince of the need to educate and broaden the knowledge of our staff. Since 2014 though, we have had their full support and the results have been astounding. One case that stands our regards one lady who was hired with no experience or background other than the fact that her mother worked at the park for many years. Faith started working in the kitchen preparing diets for the birds and from the beginning showed a desire to learn more. In 2013 Faith was promoted to staff supervisor and we spent the year training and teaching her about all aspects of the park and more about the birds in the different sections of the park. At the beginning of 2014 she was promoted to Assistant Curator and continues not only to learn more herself, but is also now teaching the rest of the staff as she goes. Nobody could have foreseen in 2011 when we hired her that Faith would be in the position she is now. All it took was time, training and passion. This is just one success story out of many we have had in the last two years due to our staff education programs.



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# Hope Taking Root at Chester Zoo

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## Introduction

Chester Zoo staged 'Hot Pink Flamingos', an exhibition that explores the different effects of climate change and what we can do to mitigate against these. It was originally designed and shown by Monterey Bay Aquarium and in a major recycling operation the exhibition made its way across the Atlantic and was staged at Chester Zoo, with some modification to suit our space and animal collection. The bulk of the exhibition was erected in the zoo's dedicated exhibit space, the Joseph Banks Room. During zoo opening hours there is always a member of the zoo's education team manning this building, on-hand to actively engage with visitors and to answer any questions they might have. We implemented three methods of evaluating visitor engagement: a comments board, recording the incidence of meaningful visitor conversations and unobtrusive visitor observations. We hoped that this variety of data would allow us to triangulate findings and uncover a more valid assessment of the exhibition. All approaches to collecting visitor data were in accordance with the zoo's research policy and ethical framework.

*Photo 1: Joseph Banks Room and Hot Pink Flamingos exhibition (bottom left)*

*Photo 2: Reuse, Recycle and reduce in the kitchen (below)*



## Content

In the Joseph Banks Room, the exhibition comprised conventional display panels and interactives, a kitchen complete with appliances and well-stocked cupboards and an audio visual presentation on a large screen. Exhibit themes included energy use, sources of alternative energy and recycling. Some additional elements of the exhibition formed a trail in the zoo grounds: to the penguin and flamingo exhibits and the aquarium, where issues associated with changing ocean currents, threats to mangrove habitats and pollution of the seas were presented.

Not all the exhibit content was suitable for the move from Monterey to Chester. A strong feature of the exhibition focused on empowering visitors to take both personal and community action. One exhibit element comprised a set of panels illustrating community action local to Monterey. For the Chester Zoo exhibition we contacted various local community groups and staged a display that featured our own 'Hope Taking Root' - a series of five panels, each featuring a local initiative to protect wildlife and the environment.





Photo 3: Comments Board

Before data collection began, a pilot exercise identified a series of 'meaningful' conversation categories in consultation with education team members experienced manning the exhibition. Staff kept a record of how many visitors they spoke to and into which categories these conversations fell. Conversations from 648 visitor groups were assessed in this manner.

For our unobtrusive observation we used systematic random sampling to select visitor groups. Once selected, the visitor group was observed moving past the area containing the interpretation. If a member of the group stopped at the one of the panels, it was recorded (attracting power), along with the duration of the stop (holding or viewing time).

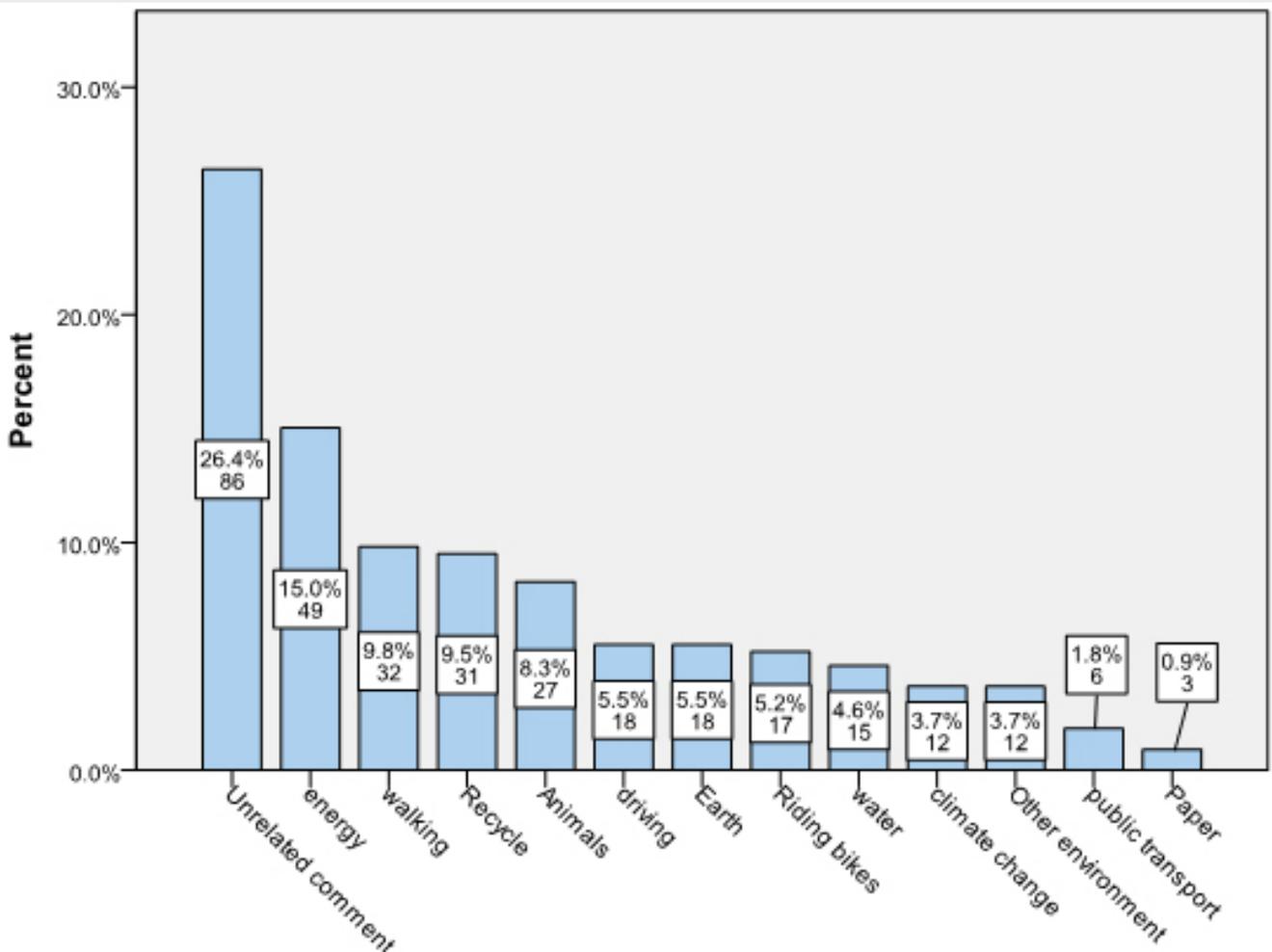
### Evaluation

The exhibition ran for approximately two years and we planned for data collection for the purpose of evaluation during part of this period. In the Joseph Banks Room we had a comments' board and education staff also recorded incidences of meaningful conversations. In the zoo grounds at 'Hope Taking Root' we conducted unobtrusive observations.

### Results: Comments Board

Visitor comments (n=264) were collected on a peg board in the exhibit. In terms of analysis, the comments were initially categorised with the assistance of SPSS Text Analytics software package (a linguistics-based text mining package). From this, we manually

Figure.1 Number and proportion of comments by category



'split' the data set into those comments that were exhibit-related (i.e. concerning the environment) and those that were not. 26% of the comments did not appear to be related to the exhibit content Figure 1 shows the number and proportion of comments by category.

The largest number of 'exhibit' related comments were found in the 'Energy' category (49 comments), and here we find a good standard of understanding into environmentally responsible behaviours (ERBs). Some respondents also made the link between ERBs and animals. For example: "Use less energy to save penguins homes" – "and bears too!". Within this category, we also found a number of participants leaving comments that sought to influence the behaviour of others, for example: "Switch off the lights when you're not in the room. Every little helps!". 'Walking' was the second most populated exhibit-related category, followed by 'Recycling' and 'Animals'. Some 'Animal' comments simply stated the participant's own particular animal preference, but the majority actually linked species to the environment. "Climate change is bad for all of us even if we enjoy the sunny weather, especially for animals in the North and South Pole."

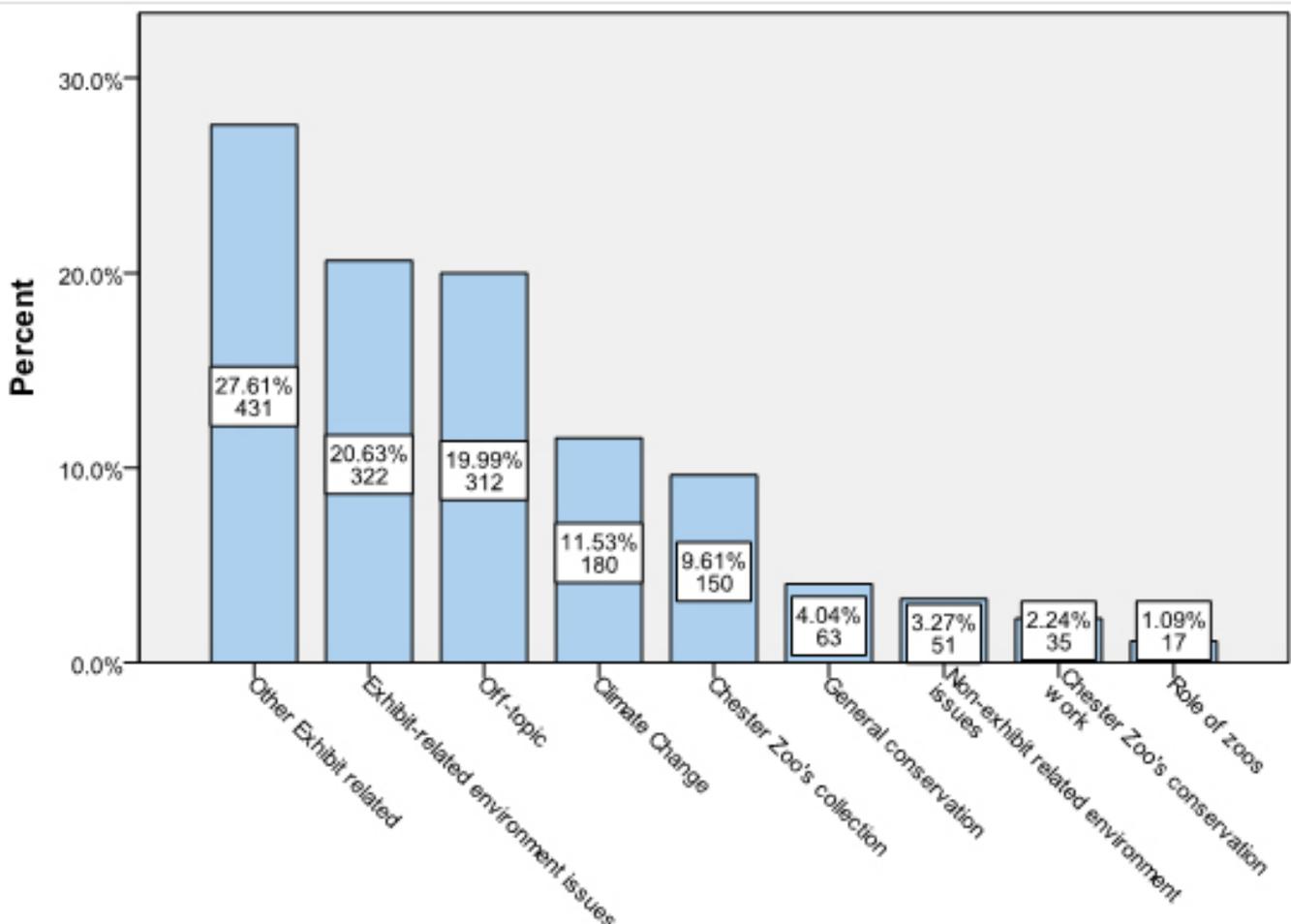
Photo 4: Display panel at the flamingo exhibit (above)



**Results: Meaningful Conversations**

Education staff had meaningful conversations with 648 out of the 4594 visitor groups during the study period. This equates to 18% of visitor groups. The majority of these conversations covered more than one environmental or conservation topic (a mean of 2.36 conversation topics), demonstrating a wide range of interests in the sampled visitors. It is pleasing to see that 'exhibit-related environmental issues' and 'climate change' made up 20% and 12% of all conversations respectively. The proportion of conversations in each category is shown in figure.2.

Figure 2. Proportion of conversations in each conversational category (below)



## Visitor Observations

Visitor groups (n=192) were observed at 'Hope Taking Root' and we found that 16% of visitor groups stopped at the interpretation, for a median of 14 seconds. The maximum viewing time recorded was 53 seconds. When we compare these to data collected at other, species-based, interpretation at Chester Zoo, we find very similar results. Namely, we have recorded an average attracting power or 12% at similar style interpretation (text and graphic), with an average viewing time of 17 seconds. This similarity in interpretation-use is positive since finding that visitors will stop and view interpretation that is not overtly species-based is extremely useful to know, given the shift in zoo education towards environmental behaviour change.

## Conclusion

We did not expect that the content of the exhibition would have universal appeal to our entire zoo audience but we made the decision to stage it because of strategy fit. The content was designed for teenagers and adults. We are encouraged at the level of interest and engagement we observed. Overall, the findings suggest that those visitors that did choose to engage with the Hot Pink Flamingos exhibit did so positively and with a high level of interest. We feel this demonstrates the value of staging an exhibit with content that is rather abstract in nature, but carrying a strong environmental message.

*Photo 5: Hope Taking Root panels*



# Living with Wildlife – A targeted pilot conservation education program for newly arrived refugees to Australia.

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## Abstract

Zoos are traditionally considered a low key education facility with a passive education role for the general public visiting those institutions, and a more targeted role for assisted school visits by primary, secondary and tertiary students. With the increasing level of relocation of families from one part of the world to another, either voluntarily or in response to civil and cross-border conflicts, a new class of zoo target audience is emerging. This paper describes the results of a pilot education program designed to introduce late-primary and early-secondary school aged children recently arrived in Australia under refugee immigration programs to Australian native fauna. The aim of the program was to facilitate a better understanding of Australian native fauna and to either dispel, or at least put in an appropriate context, the threat posed by some of the fauna.

## Introduction

A common international perception of Australia perpetuated in the media, is that of a dangerous and harsh environment filled with some of the world's most deadly animals. Accompanying this perception is a limited knowledge of how to interact with local Australian wildlife. This is usually based on misinformation and a lack of understanding of the role of these animals in nature and their biology and behaviour. Culturally, many refugees to Australia hold 'wildlife orientation values' limited to seeing wildlife either a food source, an unlimited resource, a threat to survival, or of no value at all. Chardonnet et al. (2002) discuss in a socio-cultural context the ambivalent view people may hold about wildlife. "Besides providing positive goods, it [wildlife] is also a negative resource or a non-asset, through human casualties (accidents which wound or kill people), depredation to crops, predation on domestic animals, destruction of houses and crop stores... Native perceptions rise and become very strong when wildlife is considered to be in conflict with human interests."

The current composition of Australia's planned refugee or humanitarian arrival intake includes people from Iraq, Burma, Afghanistan, Bhutan, Congo (DRC)

and Sudan (Anon. 2013), all of whom have English as a second language. Over the past five years, an average of 12 percent of the humanitarian arrivals, for a total of 5,845 people, settled in Western Australia (Anon. 2015). Newly arrived refugees receive medical and healthcare support, literacy and numeracy training and assistance with housing and formal education upon settlement. During the resettlement process newly arrived refugee families have had limited conservation-focused, exposure to native animals, their habitats and strategies for living harmoniously with wildlife. The Perth Zoo has developed a targeted primary and secondary school level education program called Living with Wildlife newly arrived refugee families and that utilises living examples of native fauna to expose refugees to the unique biology and ecological value of native animals in a family learning environment. The program is designed to be delivered by Perth Zoo's Mobile Outreach Unit.

The primary goal of the Living with Wildlife program is to nurture an appreciation of, and positive attitude towards, local wildlife while fostering an understanding of the necessity of wildlife conservation. In addition to this humane and non-lethal methods for managing problems with wildlife are also presented to program participants. A pilot study was established to measure the effectiveness of the Living with Wildlife program in achieving its goals of:

- Foster an understanding of the necessity of Australian wildlife and its conservation;
- Promote humane and non-lethal methods for managing problems with wildlife; and
- Provide positive roles models for careers in life sciences and science communication.

## Methods

Thirty school-aged children from newly-arrived refugee families participated in the pilot program. These children were enrolled in Save the Children's 'Live and Learn' Program. Participants consisted of three groups: one of mixed gender secondary students (n=6 pre-activity and n=7 post-activity), a group of 9-12 year old primary

Survey question (the same questions were used for both the pre- and post activity surveys)		Rationale for question
Q1.	Can you name four (4) different types of Western Australian animals?	Identify participant's level of familiarity with Western Australian animals
Q2.	What would you do if you saw a snake in your backyard?	Determine the initial response to being put in this situation. Facilitated activity aimed to encourage participants to take on the following key actions: 1. Leave the snake alone (i.e. do not try to kill it or catch it) 2. Advise others that a snake is in the area
Q3.	How important do you think Western Australian animals are to the local environment?	Obtain an indication of the level of importance or perceived 'worth' of local animals to Western Australia's environment
Q4.	Why do you think people might feel that Western Australian animals are important?	To identify the breadth of reasons initially held by participants and assess if participants would see native wildlife as being unique and important to the ecosystem after the facilitated activity.
Q5.	Have you ever considered getting a job working with wildlife when you finish school?	To get an indication of the initial worth and perception of wildlife careers as well as to see if Perth Zoo facilitators made an impact as role models.

school female students (n=10 pre- activity and 8 post- activity) and a group of 8-13 year old male primary school students (n=14 pre- activity and n=10 post- activity). The pre-activity survey was facilitated by Save the Children staff to minimize bias that could arise from the survey being facilitated by Perth Zoo staff. The surveys were delivered separately to each of the three groups of participants.

The pre- and post-activity surveys utilized the same question (Table 1). To ensure that post-activity survey responses were not based on immediate knowledge recall, the post-activity survey was administered three weeks after the Perth Zoo facilitated activity by Save the Children staff.

Students participated in a two-part facilitated activity lasting 45 minutes in total. The facilitated activity was delivered by Perth Zoo Mobile Outreach Unit staff at locations remote from the Perth Zoo. Each of the groups described above participated in the activity on consecutive days during September 2013. The first part of the activity consisted of students examining hypothetical newspaper headlines focusing on sensationalized animal encounters or potential encounters:

- Surfer has close call with Great White Shark
- Watch out for swooping magpies
- Red-back spiders on the rise
- Summer snake season has started

Students discussed what the reader might think, feel or want to do after reading the newspaper headline. They were then provided with a variety of resources, fact sheets and information packs to help them determine why the animal might be behaving in

this way and identify ways to avoid human/animal conflict.

The second part of the activity involved Perth Zoo staff introducing live animals from the Perth Zoo's education program collection to each of the three groups, and discussing why people might have fears and phobias regarding some native Western Australian animals. The live animals were portrayed in a positive light to emphasize how special these animals are in terms of their adaptations and roles in the ecosystem. The following live animals were utilised:

- Red-Back Spider (*Latrodectus hasseltii*)
- Shingle-back Lizard (*Tiliqua rugosa*)
- Woma Python (*Aspidites ramsayi*)
- Short-beaked Echidna (*Tachyglossus aculeatus*)

The results of the pre- and post-activity surveys were collected and the responses to questions were clustered into logical groups. Chi-square analyses (using Fisher's Exact test where expected values were less than five) were performed on the data. The null hypothesis was that there would be no difference between the observed responses recorded in the pre-activity survey and those in the post-activity survey.

### Results

There was no significant difference in the make-up of the participants involved in the pre- and post-activity surveys despite the small reduction in the total number of participants ( $\chi^2=0.52$ , d.f.=4,  $p=0.77$ ). In response to question 1 in the pre-activity survey, participants named a broad range of animals from

Responses	Pre-activity responses (N=30)	Post-activity responses (N=25)
Kangaroo	20	19
Snake	2	12
Red-back spider/spider	-	10
Emu	4	8
Koala	7	8
Blue-tongue lizard/Bobtail	-	7
Lizard	4	7
Wombat	5	7
Echidna	-	6
Cockatoo	4	2
Black swan	5	1
Kookaburra	5	1
Bandicoot	1	1
Dingo	7	1
Feather	-	1
Numbat	2	1
Platypus	2	1
Turtle	-	1
Bird	1	-
Bush pig	1	-
Caro (Sic)	1	-
Cat	2	-
Cheetah	1	-
Cing ping (Sic)	1	-
Crocodile	2	-
Dog	1	-
Elephant	1	-
Fox	1	-
Lion	1	-
Monkey	1	-
Owl	1	-
Pach (Sic)	1	-
Penguin	3	-
Tiger	1	-
Wallaby	1	-

around the world as well as Australia. Many of the Australian animals listed were iconic Australian animals. Animals named in the post-activity survey were only Australian animals. Interestingly none of the global species identified in the pre-activity survey were named in the post-activity survey. With regard to the seven most frequently identified species mentioned in the pre-activity and post-activity surveys there was no significant difference in their frequency of occurrence between the two surveys ( $X^2=11.00$ ,  $d.f.=5$ ,  $p=0.088$ ). Table 2 above.

With regard to the question of how the participants might respond when confronted by a snake (see table 3 right) in their backyard, there was a significant change in the responses following the activity ( $X^2=90.56$ ,  $d.f.=4$ ,  $p=0.00$ ; Table 3) A total of 13% of pre-activity survey participants indicated a confrontational response to the situation, i.e. essentially kill it or catch it. During the Perth Zoo facilitated sessions, participants were specifically told to leave the snake alone, back away quietly and

tell an adult so everyone knows that a snake is in the area and it should be left alone. The option of calling a professional person to remove the snake if necessary was also discussed. There were zero instances of confrontational responses in the post-activity survey.

The Perth Zoo is actively involved in in situ and ex situ conservation programs involving Australian native and some non-native species. This conservation message is embedded in all of its education programs and interpretive material provided on site and on the Zoo's webpage. What motivates Perth Zoo staff and how they perceive the importance of animals is a subset of how people from different parts of the world might view animals. In Figure 1 it can be seen that 100% of the participants that responded to survey question 3 considered Western Australian animals to be important in both the pre- and post-activity surveys. The majority of respondents of both identified Western Australian animals as being either 'Extremely important' or 'Very important', but the emphasis on 'Extremely important' decreased significantly from the pre- to the post-activity survey ( $X^2=16.81$ ,  $d.f.=4$ ,  $p=0.002$ ) but not to the point that any of the respondents considered Western Australian animals to be unimportant.

Having ascertained that the participants considered Western Australian native animals to be 'important' it

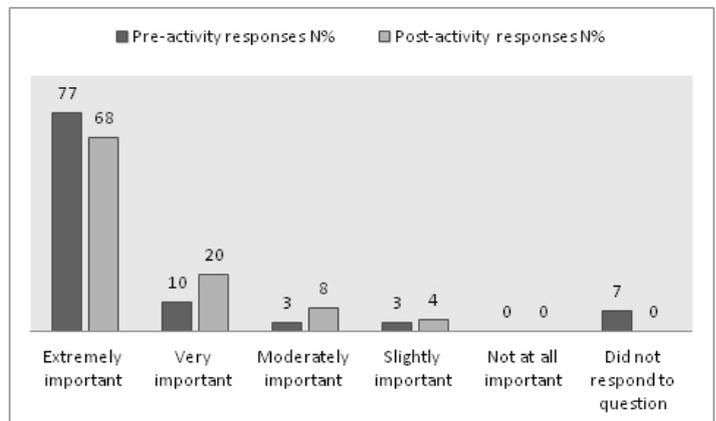


Figure 1 (above) "How important do you think Western Australian animals are to our local environment?"

Responses	Pre-activity responses N%	Post-activity responses N%
Advise others e.g., Tell a parent; I will call a zoo keeper	7	24
Leave the area e.g., Run; Live (sic) it alone and go around it instead of attacking	17	32
Leave the area and advise others e.g., Run away and tell my sis, bro and mommy; Stay away, warn everyone and tell someone	17	40
Aggressive action e.g., I would kill it because us bad having a snake at anybody back yard or run away (sic).	13	0
Catch animal and take it somewhere safe e.g., I could wear glass (sic) [gloves] and take it somewhere (sic) [somewhere] safe; if I saw a snake in my backyard I would give it to the Zoo	30	0
Other e.g., I would take care of it and show my friends for news; Just stand there and don't move	10	4
Did not respond to question	7	0

Responses	Pre-activity responses N%	Post-activity responses N%
Australian animals/WA animals are unique and can only be found in Australia/WA e.g., Because animals in Australia you can't find them in the world (sic)	13	32
Animals play an important role in the ecosystem e.g., Because some of the animals are part of the environment	13	20
Animals are a food source e.g., Because if there was no WA animals we would not have any meat to eat. e.g., Bees to make honey, fish for eating; Because they feed us and help our planet	23	12
They are endangered or might die out e.g., Because they are endangered (sic)	10	8
People like to be able to see them/interact with them e.g., Because when you go to see the animals at the zoo you will not see them; Because people love animals so they can play with (sic); Because they would like us to look at the animals	13	8
Other e.g., I am from Africa so I don't really know about WA animals; Because the animals are kind; Because they are cute	20	12
Did not respond to question	7	8

Table 4 (above) Why do you think people might feel that Western Australian animals are important?

Table 5 (below) Have you ever considered getting a job working with wildlife when you finish school?

Responses	Pre-activity responses N%	Post-activity responses N%
No	70	84
Yes	27	16
Did not respond to question	3	0

was prudent to determine what the motivation for having those views were. The text responses were grouped into six logical groups (Table 4). There was a significant difference between the number of responses in each group for the pre- and post-activity surveys ( $X^2=14.81$ ,  $d.f.=4$ ,  $p=0.02$ ). The responses indicate that as a result of the information provided during the activity, more of the participants appreciated the uniqueness of many Western Australian animals along with the role they played in the ecosystem. At the same time fewer of the participants considered Western Australian animals purely as a potential food source (i.e. bush meat).

On the issue of working with wildlife being a potential vocation (question 5) there was a significant difference ( $X^2=8.59$ ,  $d.f.=2$ ,  $p=0.01$ ) in the pre- and post-activity responses, with an increased proportion of participants indicating that they had not considered getting a job working with wildlife when they finished school

## Discussion

The participants named a broad range of animals

from around the world as well as Australia (many Australian animals listed were iconic Australian animals such as kangaroo) in the pre-activity survey. Animals named in the post-activity survey were only Australian animals, with none of the global species identified in the pre-activity survey being named in the post-activity survey. It is likely that this dramatic change resulted directly from their experience with Perth Zoo's Living with Wildlife program, coupled with the short (3-week) interval between the two surveys. Another possible explanation for the significant change may have been flow on effects arising from the discussions between the Save the Children staff and participants between the two survey periods,. This can still be seen as a positive outcome as the messages and questions may have initiated further discussion. It is interesting to note that snake, red back spider/spider, blue-tongue lizard/bobtail and echidna, the interaction animals used in the activity, were identified at a high frequency in the post-activity survey. It would appear that the opportunity to meet live animals made an impact on the participants.

The post-activity survey results also indicated a shift in perspective, with no participants listing a confrontational

response compared to 13% of pre-activity surveys listing a confrontational response to a snake in their backyard. Ninety-six percent of the participants stated that they would carry out at least one aspect of the response that was encouraged during the Zoo staff facilitated activity (i.e. Leave the snake alone; advise others that a snake is in the area). This has important safety implications for new migrants, given the number of venomous snake species that are found in urban and peri-urban cities and towns around Australia.

The positive responses to the importance of Western Australian animals in both the pre- and post-activity surveys indicate that children generally recognise the importance of animals to their local environment. It is important to note though that in some cases their reasoning did not indicate an understanding of the animal's ecological role. For example, some participants related the importance of animals in terms of a food source for people. Others expanded on this to provide a more in-depth understanding, "Because animals like bees make honey.... Bees to make honey, fish for eating". It was pleasing to see that many participants recognized that some Western Australian animals are unique and can only be found in Western Australia and that other participants felt that animals play important roles in the ecosystem.

The results of survey question 5 indicated that many children did not consider a career working with wildlife, and perversely the number of participants who considered this as a potential career decreased after the activity. The initial planning for delivering the Zoo staff facilitated activity with the refugee children factored in a portion of time for talking about wildlife career paths. However, the high level of interest and large number of questions from the children took up considerably more time than anticipated. This left less time than originally planned to discuss the idea of careers working with wildlife. The activity time could be modified in the future to include more time to discuss career paths, or alternatively the wildlife career aspect could be allocated to another day to allow Zoo staff more time to maximise the interest shown in the live animals by the children. Of the children who indicated interest in a wildlife career, the majority indicated an interest in working with exotic dangerous or charismatic animals. It is also worthwhile noting that the participants have had limited exposure to a broad range of career paths. Doctors, nurses and teachers are likely to have had a higher profile in their settlement process than many other professions.

Assessing the language skills of participants before, and while undertaking this study, proved to be

challenging. Reading levels were quite varied and verbal explanations and visual prompts proved to be extremely important in engaging with the participants. Many participants initially showed a high level of reluctance to engage in a hands-on experience with the animals, however this quickly changed when the participants saw how comfortable zoo staff were with the animals and after many of their misconceptions about the animals had been debunked.

Resettlement programs for refugees understandably focus on dealing with psychological trauma, medical care and social and cultural issues. There are many fears about coming to a new country and some of those involve animals that most new Australians are unfamiliar with. This program aimed to provide practical tools for interacting with wildlife, for example, learning how to relocate a harmless household spider, or what to do if you see a snake in your backyard. It was also able to dispel some common misconceptions about wildlife. Most importantly the program encouraged participants to have a healthy respect for wild animals and wild places with the hope of contributing towards creating well-rounded environmentally aware citizens.

This type of program could also have application in helping children who have grown up in densely populated cities better understand what wildlife still exists in their local areas, and within a broader regional and national context.

### **Acknowledgments**

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# Latin American zoos and aquariums joining efforts on a Jaguar Education and Conservation Campaign

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Educators of several Latin American zoos worked together in a joint effort of education and conservation on one of the most representative species of the region: the jaguar (*Panthera onca*), launching a campaign that sought to provide education and communication strategies to be applied in their own institutions and all those willing to be a part of it. It was developed as a regional strategy to strengthen Latin American educational processes around a common interest: the conservation of our species and the preservation of our history and culture through them (Gómez, 2014).

The initiative for this project came during the Latin American Symposium of Educators of Zoos and Aquariums held at Zoológico Guadalajara, Mexico, in August 2013. The importance of education and conservation programs on the jaguar and of the collaborative work to help improving the regional education programs as well as unify training, techniques, and information in conservation education was highlighted (Cruz, 2013).

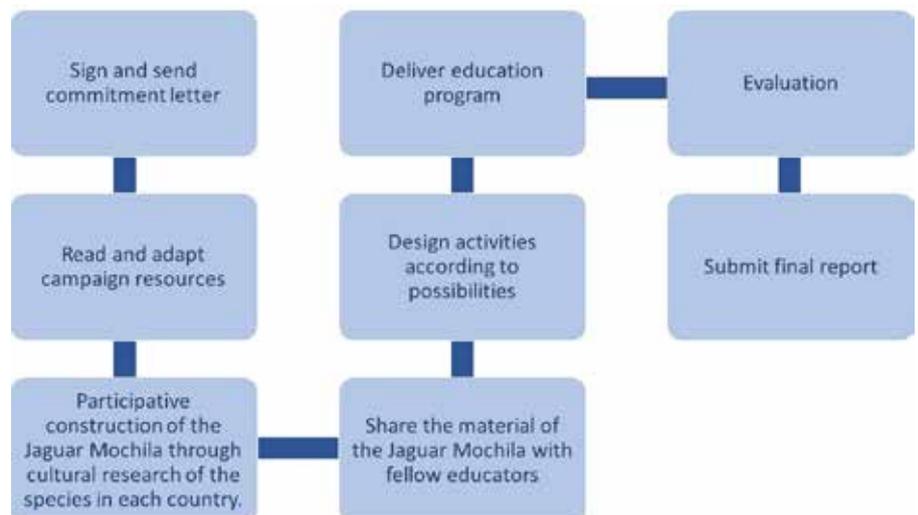
The choice of the jaguar as flagship species for this first campaign was because it's natural range includes most of the Latin American countries, from México to Argentina (EOL, 2015), it's a charismatic species, of great beauty and interest, on the IUCN red list near threatened (IUCN, 2015) but it is an endangered species in some countries of its natural distribution (DOF, 2013) illegal trade being one of the main threats (CITES, 2013), besides being an "umbrella species" i.e. the efforts for its conservation represent the conservation of a large number of species in their ecosystems.

According to the educational aspirations of a 21st century zoo (WZACS, 2005), of making a common effort to revitalize and re-focus education and training programs; develop appropriate resources; make direct links with in situ work; and engage with public needs, behaviour and aspirations, educators

wanted to make the most of their resources from both, formal and non-formal education. Coinciding with other similar proposals, the campaign was to be fun, experiential, participant centered, informational, motivating, inspirational, age appropriate and use a variety of learning styles (Lowry, 2009). Moreover, it was desirable to connect the participants with this species and its habitat through rediscovering their ancestral history and traditions.

The participants were required to sign a commitment letter to register as participant institution for the campaign; it was signed by the director and the education coordinator. Then, the education department adapted the campaign resources to their situation. There were 3 resources: a manual that was a guide to help education staff to design an institutional campaign program; a facebook page for Latin American educators, sharing the advances, programs, news and photos from the activities; and a Jaguar-Mochila (backpack); a dropbox folder where educators could share their own materials to make them available to others.

There were two opportunities to deliver the education program: on April 30th, declared Latin American Jaguar Day; and a particular date when all the institutions worked on the same topic, informing the participants that all the zoo and aquarium visitors in the region, were working on similar activities, and the



campaign itself, which activities were planned according to every institution's resources, capacities, strategies and programs.

**Content:**

- The importance of the jaguar in the prehispanic past, symbol of strength and power.
- Fundamentals of jaguar biology
- The jaguar and its habitat conservation crisis, current efforts for its conservation.
- Role of zoos and aquariums in the conservation of the jaguar.
- Participation of the society in conservation actions.

**Key education messages:**

- We all are connected, human survival depends on jaguar and its hábitat survival.
- Latin American wildlife is one of the biggest shared treasures.
- People can act to support jaguar conservation.
- Protecting its natural hábitat is a key action for jaguar conservation.
- Jaguar plays an important role in its ecosystem, by protecting the jaguar we protect many other species.
- The purchase, sale or export of jaguar products is prohibited.
- The future of wildlife depends on our daily actions. What are you willing to do today?
- Zoos and aquariums play an important role in jaguar conservation.
- Society plays an important role in conservation strategies.
- The jaguar will transcend through time and through our Latin American borders

**Evaluation:**

As part of the campaign, every institution could implement their preferred mechanisms of evaluation. The main mechanisms used for the evaluation of the activities were:

**• Diagnostic testing:**

Used to assess the previous knowledge that participants had on the topic. It was generally basic and confusing. Specially the ecological role of the species and the importance to their environment as well as the zoo efforts to promote jaguar conservation were unknown.

**• Formative evaluation**

Used to adjust teaching and learning processes to improve student attainment and to guide the attention of the participants to the relevant information sought to emphasize.



**• Summative evaluation:**

Used to determine if expected knowledge, skills and attitudes for the conservation of the species were generated. It was also used to show participant's satisfaction for the activities undertaken.

**Results:**

**1. Quantitative results**

**1.1 Institutions, countries and activities:**

A total of 10 zoos and aquariums from 5 different countries participated in the campaign, developing activities depending on their institutional possibilities, as stated in the manual.

**1.2 Participants:**

A total of 35,249 reported visitants participated in the activities of the campaign at the different institutions in 2014 (figure 3). Not all the institutions were able to share their results.

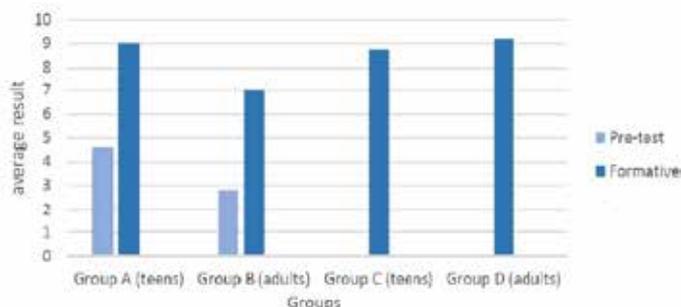
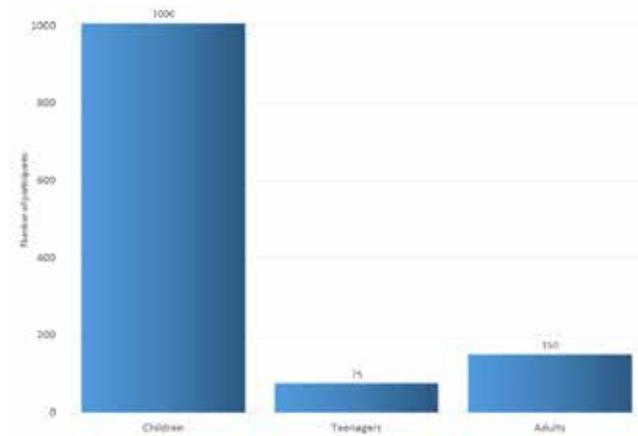
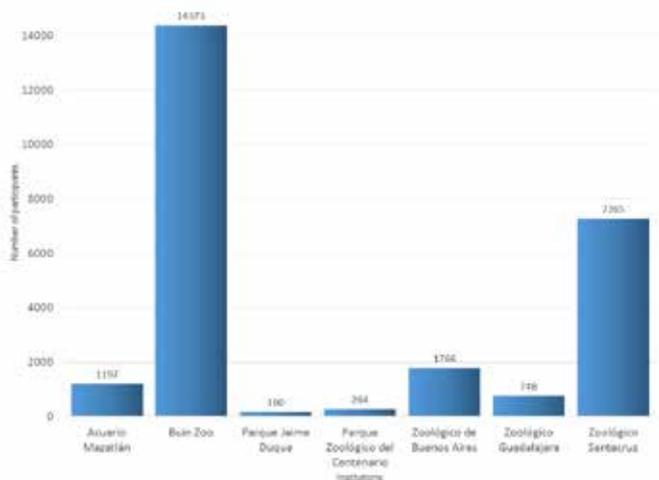
**1.3 Age groups**

Most institutions classified their participants in 3 different age groups, as an example it is shown the number of participants per age group in Zoológico de Buenos Aires, Argentina (figure 4). Although most of the activities were addressed for children, some institutions prepared activities for less represented age groups.

**1.4 Previous knowledge and knowledge assets**

The documentary "Jaguar, lord of the mayan jungle" was presented to inform teenagers and adults on the main strategies to promote jaguar's conservation in Mexico. This documentary was accompanied with a formative evaluation driven by a 10-item survey intended to measure the assets when being applied during the activity. It was also applied as pre-test to measure previous knowledge.

The average result from the survey applied as pre-test was 3.5 and the average result when



Figures 3,4,5 - summary data - number of participants; age groups; formative assessment

applied during the activity was 8.5, showing there was a slight previous knowledge and an important knowledge asset when accompanying the activity. Teenagers showed larger previous knowledge and larger knowledge assets (Figure 5). This is probably because evaluated teenagers were from a single educative institution and adults were a group with a more diverse educational background.

The documentary informed the participants on jaguar's habitat, major threats and the main strategies to promote its conservation. They were able to identify jaguar's habitat and threats and list all the strategies. After the evaluation process, the survey continued being applied during the presentation of the documentary and visitors were allowed to take their questionnaire home or deposit it in a mailbox that allowed us to track the process.

## 2. Qualitative results:

Most institutions designed and applied surveys to assess knowledge, attitudes, values and behaviors. As an example, Buin Zoo designed a 7-item survey from which 5 items were related to knowledges; 1 with attitudes and behaviors and 1 with values. They concluded that educators must make the most of our animal collection by accessing interdisciplinary information for the design contents and resources for participants of different ages and backgrounds, including aspects of ethnosciences, anthropology, arts and psychology as an integrated multidiscipline.

Some institutions used surveys to know the level of satisfaction of the participant with the activities. Most of them showed high standards including the processes of visit planning, visitor service and objective fulfillment.

### 2.1 Benefits:

- Gathering diverse literature by educators.
- Develop educational and communication materials of many types.
- Increasing of education staff training to prepare activities.
- Involvement of other areas of the zoo (managers, veterinarians, enrichment, caregivers, communicators) in this education campaign generating a multidisciplinary work.
- Increased knowledge in participants about the species and its habitat
- Generated interest in communities to participate in the conservation of the jaguar.
- Involvement of educational departments of tourism and environment ministries, educational institutions and community groups interested in the subject.
- For educators, training on the subject was very interesting.

### 2.2 Opportunities for improvements

- Optimized education staff training
- Reinforced training on evaluation processes
- Increased contact and work with communities
- Address the campaigns to the right target audience

### Conclusions:

The jaguar education and conservation campaign was a successful approach to promote collaborative work involving ten institutions from five countries within Latin America, accomplishing the goals of increasing participants' knowledge on the biological and ecological importance of the jaguar, generating caring attitudes and promoting conservation behaviors using cultural and traditional knowledge as the key component to engage people with the conservation messages.

This campaign was very interesting as a first effort for Latin American Zoos and Aquariums to collaborate on a common objective, and boost our own potential to give our visitors access to a multidisciplinary and inter-institutional experience. For them it was surprising

to know that zoos work together for wildlife conservation and their participation by adopting simple behaviors is crucial to reach this goal. The strategy of considering common ancestral history and traditions was very important, because it allowed participants to feel engaged with the values of our cultures.

This regional campaign was attractive for non-education staff, from directors to keepers and vets who showed interest in these activities and were willing to participate, enriching the activity design and enhancing the overall experience to visitors.

Online resources such as social networks, cloud storage services and virtual chat platforms proved to be useful tools to increase participation and improve communication between educators in spite of distance. Its use had significant impact in program designing and resource sharing.

The information, resources and results showed a synergic effect, increasing the opportunities of the education departments to develop optimized experiences for our visitors. This work needs to be continued to improve the education practice in our institutions, allowing them to reach international standards such as the proposed by WAZA and other zoo and aquarium associations.

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## A Latin American Experience: Education & Conservation Campaign of the Jaguar at the Buenos Aires Zoo

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### Summary

During 2014, the Buenos Aires Zoological Garden took on, for the first time, a specific role within a Latin American education campaign. To accomplish our commitment a series of actions were raised. These actions are related to the species within the various proposals of the Institutional Educational Project of the Zoo. The activities were mainly aimed at visitors (children, young people and adults) and the children participants of the non formal education program of the Zoo.

### Introduction

The Buenos Aires Zoological Garden has always been linked to the social and cultural development of the city, its eighteen hectares in the “Palermo” (one of the most important capital neighborhoods) are a meeting point, a unique confluence of Buenos Aires’s citizens “porteños” and tourists from different parts of the country and the world for over 100 years. This location increases the responsibility of promoting its development and its approach to topics related



with environmental education, conservation and preservation of natural and cultural heritage. The Zoo has a wide range of educational possibilities offered not only by the animals that make it a unique place in the city of Buenos Aires but by the integration of the landscape with its natural and cultural heritage.

Currently, the direction of Environmental Education of the Zoo of Buenos Aires City



participates in the education of children, young people and adults and a joint effort between the community, the school and the Zoo, with the conviction that it is not possible to conserve that which is not known.

One of the main goals is promoting awareness and participation of the community in environmental issues, promoting a critical analysis to develop an understanding of the environment which considers ecological, sociological, political, cultural, economic and ethical aspects.

The jaguar campaign aimed to add the work of educators of zoos and aquariums to governmental efforts, educational institutions and private initiatives that promote the conservation of the jaguar (*Panthera onca*). (Latin American IZE symposium, 2013)

### **Actions and activities**

For the implementation of these activities, the coordination of the campaign team produced reading material for environmental educators who would be in charge of groups of participants. Laminated color images were also produced to support the implementation of the activities.

#### **1) “The power of the jaguar” at the Zoo Buenos Aires Children Summer Camp**

The Zoo’s summer camp is aimed at children from 3 to 12 years and the participants have access to parts of the Zoo that can only be discovered through the camp.

Various activities were developed in the framework of the campaign: talks around the jaguar enclosure in the zoo, preparation of posters with biological information of the jaguar and images of the environmental problems of the species in Argentina and artistic activities with indigenous representatives.

#### **2) Talking about the jaguar**

The talks and speeches in the Park are aimed to visitors (children, young people and adults) and are carried out in different areas of the zoo. It

is an opportunity to learn more about some of the inhabitants of the Zoo but also environmental issues in their natural environment.

#### **3) Talking about Felines (the Felines Week)**

Visitors are invited to talks at enclosures of different cats: jaguar, Bengal tiger and lion; in some cases, with the participation of zoo keepers and members of the environmental enrichment department. After each talk, the children of visitors were invited to make artistic and practical activities in our children’s art workshop, under the supervision of our educators. The participators made portraits and a pencil-holder, among others handcrafts, from re-usable materials (rolls of cardboard, discarded equipment, sheets of magazines, cartons) through the use of stencils of feline’s prints.

#### **4) Commemorative Dates**

Throughout the year, artistic and educational activities associated with a symbolic date on conservation, the environmental problems of the species, the diversity of animals and plants, care of the environment take place at the Buenos Aires Zoo.

The educational institutions which visit the park on dates during the school year and the children visiting the zoo participate in these activities. Within the framework of the campaign were educational and artistic activities such as bookmarks, pens, picture frames, drawings and messages of awareness in allusion to the World Biodiversity Day (May 22) and the Animal Day (April 29).

#### **5) National Children’s Art Competition**

The National Children’s Art Competition promotes the realization of drawings in free technique with themes related to conservation. Boys and girls from 3 to 13 years old from all over Argentina entered in 3 age categories. After a pre-selection, the drawings are carefully analyzed by a jury. The winning entries were on display at the Museum of Children’s Art and Youth of the Zoo. The winners in each category received various prizes (books, bikes, t-shirts, caps, free passes for a celebration of the birthday party at the



zoo, night tours) that are delivered on 30 October, within the framework of the 126th anniversary of the Zoo of the city of Buenos Aires. The theme for 2014 was "The realm of the Jaguar: Argentine forests, its flora, its fauna and how to take care of them".

### 6) Little Nature Keepers

Aimed at children aged 6 to 12 years held over a year, with monthly modules, a module was dedicated to the jaguar campaign activities. Focused on formation of critical, reflective, participatory and responsibility for the need to conserve and protect our natural resources.

### 7) Argentine Natural and Cultural Heritage Monuments Month at Buenos Aires Zoo

Within the framework of the 126 year anniversary of the Zoo (October 30, 1888) and commemorating the national day of the Argentine Natural and Cultural Heritage, a talk was developed to the visiting public at the jaguar enclosure. After each talk the children painted jaguar masks made especially for the campaign by Darío Fernando Almirón Argentine Illustrator .

### Results

1766 people participated in the entire campaign. 1006 were children under 15 years old, 75 were young people between 16 and 29 years old and 150 were adults, older than 30 years old. The activity with the largest number of participating children was the National Children's Art Competition, followed by The felines week and Talking about the jaguar. The activity with the largest number of youth participants



was the felines week being the only activity where this age range participated. The activity with the largest number of participating adults was the felines week.

### Conclusion

In Argentina, the jaguar is a largely known in provinces inhabited by it. The zoo of Buenos Aires is located in the city of Buenos Aires in a neighborhood called Palermo and usually visitors come from surrounding areas to the city and the interior of the country. Therefore, the visiting public generally didn't know the species. The public interested and with previous knowledge about the issues suggested from each of the activities were children that were familiar to the subject due to documentaries about the species in the Argentina. On the other hand during 2013-2014 the road kill and illegal trade in skins of jaguar has been reported. Therefore, some initial knowledge is attributed to seeing media that disseminate this type of news. Being a native species made people show greater interest in participating especially were the children could link to the species and its habitat recognizing threats that threaten their conservation.





### Acknowledgements

We thank Miguel Vieyra, Latin America Regional Representative, for giving us the opportunity to participate and be part of this community and particularly for their permanent support and response to consultations and projects.

We take the opportunity to also thank María Eugenia Martínez from Guadalajara Zoo who drives us to perform and give continuity to conservation education proposals in zoos with their ideas and proposals.

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*Editor's Note This article has been edited from its original Spanish, please contact the authors if you want the full article/ to clarify any points.*

Environmental educators who participated highlighted the relevance of the actions carried out on the basis of the diversity of material made for them and for the participants and the interactions between zookeeper, educator and the environment of the venue. The choice of a native species encouraged participation especially with children who connected with their conservation. Such actions strengthen the role of zoos in environmental education and education for conservation and promote empathy with native species less known, generating a community approach to the jaguar and its environment. Located in zoos, parks and protected areas learning experiences reinforce their importance in the diffusion of collective strategies for awareness and participation in the prevention of environmental threats by promoting knowledge of the environment in its ecological, sociological, political, cultural, economic and ethical aspects.



# Experiencing biodiversity - the interactive activities at Opel-Zoo Kronberg

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## Abstract

This paper presents findings of an empirical case study performed at a school that investigated how the interests in biological topics of students develop over time. The results revealed a marked decrease of interest in zoo animals and the engagement of zoos in species conservation with increasing age whereas the interest in conservation biology in general or other biological subjects remained stable or only slightly decreased. These results suggest that zoo visits are especially important in higher classes to keep the role of zoos in conservation biology in mind. Implying that zoo visits provide affective experiences that encourage students for an engagement in conservation topics, this article presents an educational programme developed by Frankfurt University and implemented at Opel-Zoo Kronberg which aims at triggering students' interest in zoo animals and conservation through hands-on materials, active learning and the talks with trained guides at different teaching stations in the zoo.

## Introduction

Several studies proved the important role of zoo visits for student's science learning (Dierking et al. 2002). Positive experiences motivate people to connect with their environment and to develop a feeling of responsibility for it (Rathunde & Csikszentmihalyi 1993). Millions of different faunal and floral species live on our planet. Today, there are growing concerns about a prominent rise in the extinction rate due to human activities making the conservation of our natural environment with its current species one of the biggest challenges of our time. Together with Opel-Zoo Kronberg, the department for bioscience education at Frankfurt University created an educational programme that aims at motivating school groups to experience and to cherish the biodiversity through the direct dialogue with the zoo staff, interactive hands-on materials and the encounter of zoo animals.

## Material and Methods

In an empirical study conducted with 1141 students, the department for bioscience education investigated students' interest in different biological topics including zoo and conservation issues. The students were asked to rate their personal interest in zoo animals, the work of zoos concerning species conservation, environmental conservation issues, the school subject biology and diverse other topics from the field of human biology. The interviewed students derived from age groups between 11 to 18 years. For the data analysis, the students were grouped in four different age classes and average values on an interest scale from 0 (not interested) to 3 (strongly interested) were calculated.

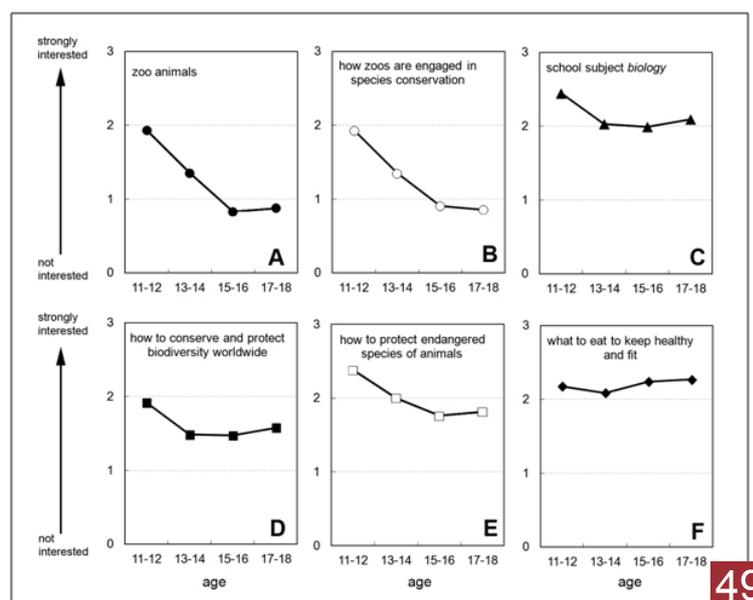
## Results & Discussion

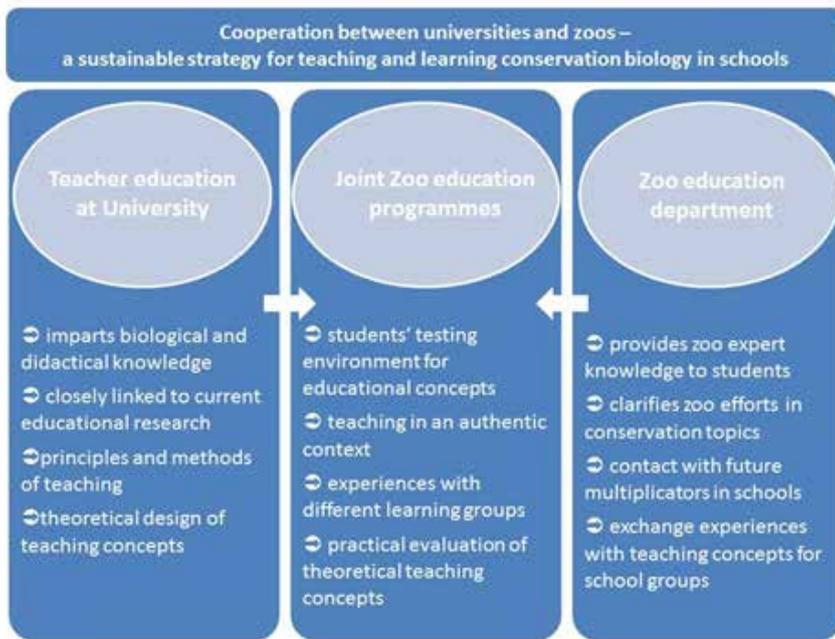
The data clearly show that older students' interest in topics such as zoo animals or the zoo's work in species conservation is significantly lower

compared to younger age groups and remains consistently low at about the age of 14 to 15 years, whereas other biological topics (e.g. human health) remained unaffected or increase (see Figure 1). Over time, students' general interest in conservation biology (protecting endangered species or biodiversity) only slightly declined, which may be linked to the similar decrease of interest in the school subject biology.

Frankfurt University and Opel-Zoo Kronberg designed the educational programme "Experiencing Biodiversity at Opel-Zoo Kronberg" to increase awareness of the biodiversity surrounding us and to counteract the decrease of students' interest in zoo animals and conservation work at zoos. As didactic and psychological research has proved, school field trips can be a vital means for improving children's learning by giving authentic experiences (Pedretti 1997,

Figure 1: Students' interests in zoo, conservation, human biology and school subject biology (age 11-12: n = 343, age 13-14: n = 299, age 15-16: 252, age 17-18: n = 247; standard deviations varied between 0,67 and 1,07 and error bars were omitted for reasons of clarity).





*Figure 2: the synergy between academic education and practical work in the student teacher training*

Dierking et al. 2002). Extracurricular education and out-of-school-experiences belong to the major emphases of teacher education at the department for bioscience education of Frankfurt University. The overall principle is the combination of the theoretical education at university and the practical implementation of this knowledge at out-of-school learning environments. So, the cooperation between university and zoo pursues the mission of reaching both, school groups and student teachers. Only if future teachers have specific application examples they will be able to implement conservation topics in their later classes and thereby promote a profound environmental education at school. In this way visiting Opel-Zoo Kronberg and participating in the programme can be a successful tool to motivate and encourage students from school and university to enhance their interest in zoo animals and conservation work. Figure 2 illustrates the principles of the student teacher education at the department for bioscience education.

*Figure 3: teacher trainee with students at a working station (Opel-Zoo, Dierkes)*



Within the framework of their academic education at Frankfurt University student teachers can join in the seminar “Biodiversity at Opel-Zoo”. Participants get introduced into the theoretical backgrounds of conservation biology, zoo history and zoo pedagogy and have to design teaching concepts covering different topics of biodiversity which they implement in practise during the days of biodiversity at Opel-Zoo Kronberg (Figure 3). During their conceptual work at university and at the days in the zoo the student teachers get expert advice from university staff as well as from zoo educators. In this way the zoo becomes an informal learning environment for student teachers which enables the realization of action-orientated teaching concepts in the field of environmental

education.

The various working stations spread around the zoo area were designed to cover a wide range of age groups and a variety of biodiversity topics. The degree of complexity at each working station is adjustable for the needs of different age groups. Visiting the working station “diversity of apples” younger students can explore the diversity via taste test, whereas older students are informed about genetic differences which lead to different types of fruits. The usage of new media (3D-animations, whiteboards, online-tools, etc.) referring to animals in the zoo aims at particularly attracting students from older age groups and thereby reinforcing their interest in zoo related topics (Figure 4). Further, new digital media enables insights into morphological structures (e.g. carnivore dentition) that are not always visible at the zoo animals. Topics covered at the working stations between the years 2010 to 2014 were among others: genetic diversity of fruits, protection of the oceans, primate tree, importance of honey bees or bat diversity. At the stations, school groups as well as zoo visitors can participate in games, do puzzles and use scientific devices such as binoculars or bat detectors. To support the learning effect during their journey through the zoo visitors get equipped with worksheets and maps at the entrance and every station. One of the highlights was a “climate breakfast” which showed school classes how to reduce carbon dioxide emissions starting with their first meal of the day. This working station refers to our daily lives and aims at the sensitization of ordinary consumer behaviour. The “CITES” station draws the visitors’ attention to the problem of international illegal animal trade and the concomitant threat to various species and ecosystems. The visitor learns how customs works, why certain plant and animal species have to be protected, why certain souvenirs are illegal and what all this has to do with biodiversity. “Getting

in touch with donkey (*Equus africanus asinus*), goat (*Capra aegagrus hircus*) & co” is possible at the petting zoo (Figure 5). Here, young visitors are invited to acquire a “license” for the petting zoo. They learn how to deal with these domestic animals; get to know their behaviour and hopefully reduce fears of contact.

The programme “Experiencing Biodiversity at Opel-Zoo Kronberg” turned out to be a successful tool for student teachers to gain insights into the conservation work of zoos. They could develop their own ideas through creative work and gain practical experiences which are essential for the later implementation at school. Further, it enabled school groups the direct encounter of zoo animals and showing different facets of biodiversity hopefully generated interest in zoo animals and conservation.

### Conclusions

Through their decisions children and young adults shape the future of our environment. Therefore, students’ interest in topics as zoo animals and conservation biology needs to be strengthened. With the educational programme “Experiencing Biodiversity at Opel-Zoo Kronberg” school groups can interactively explore wildlife and conservation work and future teachers get equipped with a framework and strategies for a successful implementation at school. In order to rate the success of the programme, case studies investigating in today’s teaching practices of former student teachers are needed. Their experiences can be a helpful tool for the further development of the seminar structure and the programme in the zoo. What can be stated for now is that the cooperation between university and zoo combines the theoretical academic education with the practical work of zoo educators – and this again seems to be a promising and sustainable approach.



Figure 4: students elaborating an interactive 3D- tool on the carnivore set of teeth on a touch panel (Opel-Zoo, Dierkes)



Figure 5: getting in touch with sheep in the petting zoo (Opel-Zoo, Ripberger)

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# Diversity- the difference is in the detail!

## Educators effecting awareness and behaviour change through Visitor Engagement

Adam Senior, CREWtraining.uk.net

Myfanwy Griffith, EAZA Director

**The Scene:** As the early morning light painted arboreal art with the inspiring fauna of Lisbon Zoo a rare sighting of *Educatus europaeus* was recorded gathering to quench their thirst for knowledge at the European Association of Zoos and Aquaria (EAZA) Academy Seminar watering hole. The herd warily sated themselves with coffee and pastries as they acclimatised themselves within their new enclosure. The twenty-eight Pan-European zoo educators had found shelter in the warm hospitality of Lisbon Zoo to attend the EAZA Academy Seminar: "Communicating Biodiversity Through Visitor Engagement" delivered by Adam Senior, CREW Training and Development, UK.

**The Challenge:** To facilitate a day in which this collective group of educators could explore strategies and techniques for 'starting the Biodiversity conversation' with more visitors, more frequently, more effectively. How to communicate biodiversity, across the whole Zoo experience, with more impact and translate these methods into practical applications for use with their visitors in their own Zoos to raise awareness, alter attitude and change behaviour.

"EAZA understands both the pressing need to communicate about biodiversity conservation to a wide range of visitors, and the challenges that this task presents. EAZA is experienced in partnership working and the interactive courses offered by CREW provided an ideal way to share their various approaches to developing a coordinated visitor engagement strategy amongst our community".

Myfanwy Griffith, EAZA Executive Director

"I was so pleased to be asked to deliver this seminar because the EAZA Seminars offer a unique opportunity to work with so many European Zoo educators, exploring best practice across the community and facilitating creative development with participants from such a wide range of Zoos. With so many differences in size, environments, demographic cultures, stages of development and staffing structures my aim was to harness and empower their one common factor... the passion to share knowledge and make a difference" Adam Senior

### The Seminar

The seminar was designed to explore opportunities

for delivering visitor engagements, strategically placed throughout the course of the visitor experience and explore the nuances of delivery techniques... 'what to do', 'where to do it' and 'how to do it'.

The task was to investigate a range of different visitor contact opportunities (Photo 1) and examine how to



make these most effective by fine tuning 'engagements' and drawing as many visitors, as possible into the conversation. In my experience of staff/visitor interactions... the slightest adjustment in approach, style and technique can make a huge difference as I always emphasise in training... the difference is in the detail.

With this purpose in mind the assembly was split asunder and the *Educatus europaeus* were set the task of culminating their taxonomies to emerge as three single animal collectives. From the melee emerged three unified, determined and committed teams: The Lion Pride, The Giraffe Tower and The Wolf Pack.

Within the distinguished taxonomies we had a wide range of participants, providing linguistic, cultural and professional diversity. This was all very useful, as we were assembled to explore engagement opportunities throughout the whole zoo experience, embracing the importance of every job role ... right across 'The Visitor Engagement Spectrum©'.

### 'The Visitor Engagement Spectrum©'

The Spectrum was explained as a way of viewing the whole Zoo experience (from car parking and admissions to fond farewells and last impressions) as a series of opportunities for encouraging visitor interaction with staff/volunteer teams.

The Visitor Engagement Spectrum© is divided up into four sections with opportunities to create lasting, memorable impressions, inspiring awareness and

behaviour change in our visitors.

- Customer Service
- Site Engagements
- Talks
- Shows

This approach encourages coordination right across the Zoo team: using 'Pro-active Welcomes' at admissions to drive visitors towards staff, events and talks, empowering all visitor facing staff to engage across the site, actively extending conversations into hands-on, personal and memorable experiences; harnessing talks and events to inspire change and capitalising on shows/demonstrations to get them emotionally involved...make them feel, make them care!

You can't make them change... but you can make them want to change!

After we had discussed ways in which CREW clients had experienced practical success with these approaches (increased visitor awareness and donations and secondary spend) participants proceeded to bash their cerebra together in order to articulate clear, concise Biodiversity Mission Statements; which they were then challenged to communicate effectively through a plethora of creative engagement techniques.

### Engagement Techniques

If music be the food of love then... enjoyment is the food of engagement!



We explored a series of human verbal and non-verbal communication skills that could be used to make conversation and hands on activities more enjoyable, engaging and ultimately more inspiring.

We tried, tested and played with the nuances of

turning animal based conversations, enclosure talks and object handling into more enticing and exciting formats: 'My Favourite Animal' (Photo 2), 'Observation Tests' and 'Secret Treasures', etc. With much fun and frolics the group 'wallowed in the mud bath' of participation. In fact they not so much 'wallowed' as... dived in, snorkelled, backstroked and presented synchronised swimming displays of excellent engagement skills and techniques.

### The Personal Touch

In conjunction with these techniques we explored how to use human communication skills (personal opinions, body language, volunteer encouragement

and participation rewards, etc.) to nurture and encourage visitor engagements in such a way as to provide positive and rewarding experiences for all involved. From the simplest smile, to the briefest nod, to the warmest words your staff can create a very powerful positive impression throughout the whole visitor experience.

In contrast, if a member of staff is not actively engaging or acknowledging visitors (during their daily routine), what impression does it create? Ostensibly, they are saying in a very loud voice "I do not care!" This in turn means that your visitors will not 'care' about you or your 'message'. Whilst this is alarming on a conservation awareness level it is also fundamentally damaging on a commercial level. As with all service industries, these negative impressions are almost always the most memorable and 'Trip Advisor-able' of all.

It is so important to look at your Visitor Experience and strategically plan your visitor engagement contact points, making sure that all staff/visitors have received appropriate training and direction so that they can play their role in ensuring all visitors feel appreciated and receive 'added value'.

We explored some of the creative ways that CREW clients had achieved this, finding solutions to the 'usual suspects' of lack of time, resources, money and staff. How they had overcome the issues associated with... so many visitors, so little time, so much work, so many 'mouths' to feed/muck-out/wash/enrich/interpret/conservate and poured these ideas into the 'creative cooking pot' for tasting, ingestion and consideration.

### Visitor Engagement Strategies

The Wolves, Giraffes and Lions forgot old rivalries (and predatory tendencies) and split into creative partnerships to work out generic and site-specific Engagement Strategies. We encouraged knowledge sharing and innovative thinking to discover strategies that could work for them when faced with the harsh realities of life once they returned to their own particular jungles. They then identified the communication and engagement skills that staff/volunteers would need to be able to deliver at these points of contact. This gave them an outline for their own visitor engagement training and development strategy... all they needed to do was take the first steps to putting it into practice... start small, start simple and celebrate success.

### Participant contributions

Throughout the day we had the pleasure of witnessing some great examples of ideas, skills, communication confidence and engagements techniques from the trainees as they participated in...

- Brainstorming (Photo 3)
- Teamwork (Photo 4)
- Problem Solving
- Practice and Presentation (Photo 5)
- Feedback and Support
- Fun! (Photo 6)



It was a great pleasure to work with such a creative, skilled and open minded collection of educators from across Europe who were so clearly united in their shared purpose... to fine-tune their skills, voice their passions, share knowledge and to make a difference.

### Results and aspirations

As with all training, the results will be seen in the application of techniques and best practice within the individual zoo environments. With such a wide range of Educators at so many levels of experience, provision and location it will be really interesting to hear how they have applied the techniques and strategies to achieve real results on the ground. The EAZA Academy has committed to organising a six month survey of the course participants to ask which of the formats, techniques and strategies they have successfully used to communicate biodiversity more effectively with their visitor demographic.

Initial feedback from the participants indicated that a very high percentage learnt new knowledge and skills and would recommend the training to others. The part of the training that many identified would be most applicable back in their institutions was the detail in relation to the 'what/why/how' process. Participants felt that this process helped structure ideas and develop a clear goal for biodiversity engagement that could be easily understood by other people. Practical ideas about how to improve outreach with existing material/content were also appreciated. As with many training events the interactive elements and activities served not only to reinforce the theory but, also enable participants to share their personal experiences and develop stronger networks amongst their colleagues.

### Conclusion

This was a great opportunity for like-minded animals to collaborate and explore together. By investigating the benefits of coordinated Visitor Engagement Strategies and scrutinising the nuances of effective communication and engagement delivery we unveiled some real gemstones of creativity that participants could embed within their own zoo staff/volunteer cultures upon their return.

My advice to all zoos and aquariums that want effective visitor engagement with the associated

'message' delivery benefits, is to treat your visitor engagement in the same way as your established strands of operation and develop a clear strategy, d e d i c a t e resources to its delivery and embed it across your whole team:

- Define your Engagement Ethos
- Map your strategic visitor engagement contact points
- Plan and resource staff/volunteer team engagement delivery
- Train and develop engagement skills
- Deliver across Visitor Experience
- Evaluate and Support

It will make a huge difference and... the difference is in the detail.

I am not sure what the collective noun for Educators is, I would, perhaps suggest... an Inspiration? Well, once fully sated by the EAZA academy seminar this 'Inspiration' migrated to another watering hole, the EZE icebreaker at the Lisbon Zoo a thoroughly enjoyable chance to enjoy the balmy evening light, meet giant insects and lock 'conversational' horns with the great and the good of the European Zoo Educators community.

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# Teacher Training in the Zoo: A pilot project at the Parque das Aves, Brazil

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## Background

The Parque das Aves is located on the borders of the Iguazu National Park on the triple frontier formed by Brazil, Argentina and Paraguay. From a trail through the Atlantic rainforest, that runs for 1.4 km, our visitors have contact with more than 1100 animals from more than 140 species from across the world. The Parque das Aves also works as a recovery and shelter site for birds brought in by environmental authorities. Around 50% of the Parque's birds have been rescued from traffickers and gained a home where they can live healthily and happily.

The environmental education department develops activities for schools promoting knowledge and understanding around trafficking, hunting and mistreatment of wild animals. The team is multidisciplinary and develops projects, campaigns for the general public and attends to school groups, on average 30,000 students per year. Education programs are constructed and developed based on WAZA (2009) principles, in which education is a focus of zoos worldwide.

In 2014 the environmental education team initiated a pilot project, concerned with the continuous training of teachers on the importance of biological diversity and its protection, focusing on the Iguazu National Park, where the rich Atlantic rainforest suffers from poaching and illegal plant removal.

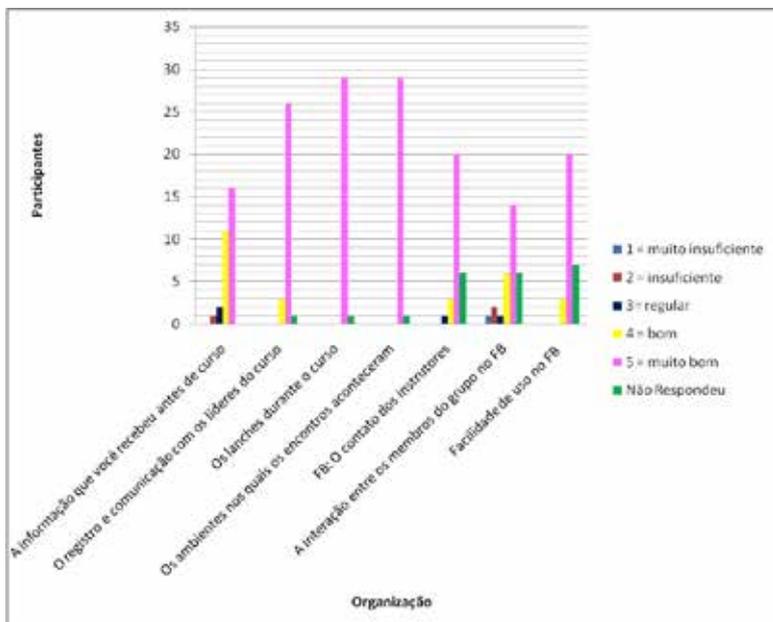
The project was called "SOS Fauna" and was developed through important partnerships. At present it promotes dialogue between local institutions, as well as stimulating teachers and students from state public highschools in Foz do Iguazu to defend biodiversity in the national park.

## Methods, Results and Discussion

Participant action-research guided this project, in that we encouraged an exchange of knowledges. The subsequent special treatment of shared information allowed a participatory methodology (Junior, 2005). Non-formal education spaces (zoos and aquariums) are located in territories that accompany the life trajectories of groups and individuals, outside schools, in informal settings, where there are intentional interactive processes. This allows a collective process of knowledge-creation that is inclusive and welcoming and that can be understood as an "Ecology of Knowledge".

This project invited professionals and local residents who worked in the same context to share their knowledge and perspectives in a series of dialogues. This allowed a conversation over the importance of local and specific knowledge in contributing to global knowledge, in this case relating to the Iguazu National Park and its ecological and social relationships.

Currently there are 40 teachers participating, from 22 state schools from 3 municipalities bordering the national park. Some of the speakers and principle partners include: UNIOESTE (The State University of the West of Paraná) which certified the course through their education department; ICMBio (Chico Mendes Institute for the Conservation of Biodiversity); and the Regional Education Nucleus, who supported the project, disseminated it and connected the Parque with interested teachers in alignment with their curriculum and internal regulations (BRASIL, 2012).



The activities were presented and discussed with the project partners and later with the participants, following the approach summarized above, and being open to any changes that were necessary.

The organization, communication and reception were all realized by the Parque das Aves education team, as well as all the group activities, orientations, messages and guidelines (including those online). At each monthly meeting there was a program with speakers, conversations with the speakers, group games and snacks.

Through Facebook, the participants of the project kept in touch with each other and us. We found we had reasonable success with this social media, (see some feedback comments below for more).

In the first meeting, we explained the content of the course and also the objectives of the education department, as a zoo sector offering a structured course like “SOS Fauna”. Following WAZA (2005), zoos should make it clear to their publics that their mission is conservation, conducted with the highest levels of animal welfare. Following this, the participants were invited to come on a trail through the Parque with the theme “SOS Fauna” (here we used materials loaned by the 5th Battalion of the Paraná Military Environmental Police, we will reuse this material for the school visits in the following months).

The second meeting had as its principal speaker the environmental analyst and “poacher-hunter” from ICMBio, Ivan Baptiston. Following this there was session on pedagogic training from the education department coordinator Angela Tischner and Professor Berenice Borssoi from UNIOESTE. According to Loureiro (2007), bringing in reality, from outside of schools, and then returning to the community with educational activities creates connection between people, institutions and ecosystems. This process can be understood as an educational environment conducive to the development of a critical environmental education,

which starts at school, but takes place beyond its walls.

The third meeting was structured around a conversation with PhD researcher Anne-Sophie Bertrand (University of Lisbon & ZSL), and the local farmer Silvio Guerini, moderated by Thiago Reginato from the education department. Anne-Sophie presented the results of her work looking at mammal populations over time through the national park and surrounding areas. As a complement to her scientific work, Silvio spoke of the conflicts and disputes between local farmers and the national park.

The fourth meeting took place in “Escola Parque”, the education department of the National Park and was led by an analyst from ICMBio, Mariele Mucciato. Following this the teachers responded to a quali-quantitative questionnaire, anonymously, to evaluate the first stage of the process. The results can be seen in Graphic 01.

Around 75% of the participants were present and responded. The comments from the teachers showed a variety of reactions, which we could separate into three categories: organization, content, and general and emotional reactions.

Concerning organization, there were positive comments over the “reception” and the “welcome” and also with the “sequence of the project” and the clarity of the explanations. On the other hand there were many comments about a lack of time and many asked for “an increase in certified hours” which we had fixed at 60 hours. There were one or two negative comments, for example that the project-development part of the course was “unnecessary and a waste of time” or that they lacked enough orientation to help develop the project, but the majority of responses were positive. Many also suggested that the course be broadened to include more participants.

Concerning the content, there were many comments about “new knowledge” learned from each speaker





and that “it was good to get information from people who lived in the region.” The majority praised all of the speakers and the group games and activities. Many also mentioned the utility of the content and how it will “improve my work in the classroom”.

Concerning general and emotional reactions, the participants were pleased with the “use of different places for different parts of the course”, but one of them commented that we needed a “bigger space”. Also there were various comments around “interaction with colleagues” both in the Parque das Aves during the course and on Facebook, but they commented “people should post more and visit Facebook more often.” We also found out that several participants weren’t accustomed to using social media and two were not registered.

The results expected for this pilot project go beyond pedagogical practice. It is expected to strengthen the local identity of those involved in relation to the Iguazu National Park. We believe in a transformative education that through the zoo’s contributions, we are able to engage students, teachers and local communities to respect and care for the biodiversity of the Atlantic Forest.

### Conclusion

Local partnerships are fundamental to valuing culture, history and local knowledge. Promoting the socio-environmental context and contribution of each participant, who has a unique sense of belonging, can enrich both content and pedagogic practice.

In this context, it can be concluded that the role of the zoo can be extended into the community in a practical and efficient way. These partnerships can increase the visibility of the zoo as a non-formal education provider and still promote the mobilization and intervention of environmental education actions in local socio-environmental issues.

The “SOS Fauna” pilot project has performed with success for our partners and principally for our participants, following the results presented above and the level of participation in the course.

### Acknowledgements

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# “ConCiencia Activa” An Environmental Education Program: a holistic and integrating approach

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3. Educational Communicator

**Fundación Teraikèn, Argentina**

**Abstract:** ConCiencia Activa is an educational program of Fundación Teraikèn, that promotes the design and implementation of hands-on projects related to the protection and conservation of the environment. Throughout the year, it comprises three moments: training workshops for educators, coaching the project implementation, and a two-day National Meeting where children and young leaders presented their experiences through a variety of interpretations.

“The Earth is not ours, we belong to the Earth”

Native Patagonian Mapuche Community proverb, quoted by Ricardo, 16 years old, Secondary School

## Introduction

ConCiencia Activa is a branch at Fundación Teraikèn (FT), an Argentinean Non-Profit Organization that has been working for 13 years protecting Nature: educating, researching and preserving species and ecosystems, giving priority to native ones, together with other institutions and involving the whole society.



Also FT manages the Teraikèn Biopark, a Species Reproduction Center in Buenos Aires; and Osununú Natural Reserve, in Misiones. Among other activities, FT carries out Conservation Programs, Research Projects and Educational Programs.

FT's Education Department is

convinced that learning networks and collaborative processes strengthen efforts to protect the environment and encourage nature conservation actions. In this way, civil society organizations have the ability to incorporate the latest advances in the field and to rapidly translate them into action programs, which is what Fundación Teraikèn aims for.

Today, the main aim is to move from the anthropocentric position from which we currently view the world, to having a more biocentric attitude. This experience cultivates in us a more humble, respectful attitude towards the complexity and beauty of the living things, thus promoting feelings of veneration, love and care of life and its diversity.

Environmental Education promotes mainly relational ways of thinking, i.e. thoughts that are able to establish bonds with others. Instead of classifying on the basis of difference, emphasis is given to interrelation and interdependence. We value that thing that is not evident, that thing that is in “between”, that thing that allows us to claim that nothing exists in isolation and that neither nothing



nor nobody is something in itself, but in connection with the context it belongs to (Priotto, 2013).

Interdisciplinarity becomes almost a condition for knowledge on this field.

A systemic perspective and interdisciplinarity seem to be derived logic in this proposal. The conservation of species and natural ecosystems will be one of the many consequences of an approach focused on the promotion of what J.G.Gaudiano called “environmental literacy”. We want citizens capable of performing complex, critical thinking of each scenario, articulating social-cultural-political-economic fields among others; citizens able to understand the main roots of problems and ready to work with others in the transformation of their local environment.

Understanding the environment from this perspective entails deep changes in the way we construct knowledge, as it helps to overcome disciplinary fragmentation in order to approach a study field that has to be interdisciplinary like the environment. Besides, it implies an ethical valuation by recognizing that we are part of the environment. Therefore, what one does, impacts upon the other and in turn, on all other forms of life. This social perspective of the environmental field stresses our approach, inviting us to imagine, design and build respect of all life forms.

One of the most recent education programs is “ConCiencia Activa” (a wordplay meaning both active conscience and active science) it’s an annual environmental education program for students, teachers and educational leaders from schools, NGOs and community members. Our program guides educators as they work with students to create and present participatory projects, whose goal is to increase conservation awareness and encourage commitment to preserving the local environment.

“ConCiencia Activa” ultimately strengthens our institutional mission: Protecting nature together. (Look at 2014 video: [https://www.youtube.com/watch?v=yJToCV6\\_8h8](https://www.youtube.com/watch?v=yJToCV6_8h8) [www.edufundaciontemaikén.org](http://www.edufundaciontemaikén.org))

### Methodology

ConCiencia Activa was constituted as a program aligned to the ministerial guidelines, seeking in their design and implementation a collaboration to overcome the weaknesses identified in the diagnosis. It is a free environmental education program, intended for educational institutions,

public and private, and social organizations. The program includes resources and tools specialized in the environment developing knowledge, critical in the relationship between human beings and the environment, with the creation and construction of solutions to specific problems. It contributes to the integral development of the students and teachers, by integrating components and processes that impact on the improvement of the quality of education inside and outside of the institution.

### General Goals:

- a. Sensitize local education leaders about environment care and conservation.
- b. Promote the design, implementation and presentation of participatory projects related to environment care and conservation.
- c. Facilitate the sharing of knowledge on these issues among local civil society actors.
- d. Increase and enhance conservation awareness.

### Measurable Objectives:

- a. Increase the participation of educators in trainings.
- b. Improve the quality of the submitted projects.

Using a multidisciplinary approach incorporating critical pedagogy, multiple intelligences, ethics education, information and communication technologies, and art (as an expression of environmental complexity), ConCiencia Activa promotes an integrated-phased process: enhance and increase awareness; collective construction of knowledge; commitment to action; networking; motivating inspiration; and replication. With these bases, ConCiencia Activa educational program is annual and encompasses five clear-cut stages:

- 1) Online enrollment: Open and free.
- 2) Training Workshops: Educators are invited to participate in training workshops and meetings to exchange knowledge. Four free days of activities are carried out in Temaikén Biopark, addressed





to educators and educational leaders. We host workshops sessions which are carried on by renowned experts in educational and environmental aspects.

**Environmental Topics:**

- Environmental education
- Sustainable Energies
- Integral solid urban waste management
- Healthy Food
- Biodiversity
- Environmental communication

3) Project design and development: Participants are encouraged to identify an actual local social-environmental problem with the aim of designing and implementing annual strategies that provide contributions to its resolution. These issues will be discussed among the school, the neighborhood or the local community. Each group will develop an environmental project selecting one of the following themes: Biodiversity conservation, sustainable use of natural resources or integral waste management. In order to help in each stage of this process, a “Guide for designing projects” is provided.

4) Coaching and follow up Reports: Throughout the program participants are required to submit two reports: a design report and an advance report, for the educational team to assess.

5) ConCiencia Activa National Meeting: This is an event for participative and inclusive exchange, in which kids, teens and educators share experiences related to environmental care and conservation through a variety of interpretations: plays, comedies, storytelling, films, blogs, radio programs, science fair-type booths and posters, folklore songs and dances, board games, and murals..



The two day meeting offers the ideal space and setting where experiences are shared and discussed within a framework full of creativity, diversity and fun.

**Results**

The success of “ConCiencia Activa” is fostered by empowered participants replicating the educational products and processes in their communities, thus spreading the seeds of awareness and the critical message of environmental preservation.

In 2013 pilot experience, more than 5,000 attendants, students, educators, and families participated in the National Meeting. Also nearly 100 teachers attended our workshops. In 2014 there were more than 6,000 attendants, students, educators, and families in the National Meeting and 200 teachers in our workshops. We assess teachers training workshops and environmental projects.

- Information is processed every day and general assessment is carried out at the end of the process.
- Training sessions are designed according to the needs shown by the teachers and the results of the projects submitted the previous year.

**Environmental projects:**

A detailed analysis of the project implementation and methodology is performed. Each project is supported by a tutor who carries out the follow up with the teachers through phone calls or email. At the end of the year there is an overall quality assessment in order to improve future program.



## Conclusions

The program presents:

> a holistic view of environmental issues and biodiversity including the political and social aspects.  
> environmental literacy and critical citizenship-oriented vision.

> social inclusion: the activity is integrated and adapted to people with disabilities.

> technological innovation: new languages, IT tools, social networks and art expressions.

> Our educational platform: [edufundaciontemaiken.org](http://edufundaciontemaiken.org) where participants can find content on environmental education, share experiences and exchange knowledge and expertise. This tool is complemented with social networks, such as Facebook and You tube.

> Students projects:

<http://www.youtube.com/watch?v=9G36ZwEC-2o>

<http://www.youtube.com/watch?v=9bN6AzDwLLO>

<http://www.youtube.com/watch?v=NlcTHT4RZJ4>

<http://www.youtube.com/watch?v=q0b-6Svnez0>

Blog: <http://salvemosnuestrolugar.blogspot.com.ar/>

This program is an opportunity for any teacher or educational leader, who is interested in designing and developing project in environmental education, to join this learning community and to participate in a collective construction of environmental knowledge.

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Fundación  
Temaikèn



# Conservation Behaviour: Change Begins at Home

Judy Mann

SAAMBR: Conservation Strategist, South Africa

## Background

The South African Association for Marine Biological Research (SAAMBR) was formed in 1952 with the aim of contributing towards the wise and sustainable use of the marine resources of the region. Through the operation of a large aquarium and dolphinarium (uShaka Sea World), a marine research institute (Oceanographic Research Institute) and a marine education centre (Sea World Education Centre), this non-government, not-for-profit association is uniquely positioned to lead marine conservation in the Western Indian Ocean. With over 60 years of experience in practical conservation through field research, building awareness of the marine life through the oceanarium and teaching people about marine life through the education centre, the association plays an integral role in helping the people of eastern and southern Africa to care for the marine environment.

Maintaining a world class oceanarium (with a standing volume of over 22 000 m<sup>3</sup> of water and 800 000 annual visitors) whilst running an internationally respected research institute and an Education Centre (catering for over 100 000 learners per year) is a complex task. Nevertheless, we knew that we had the potential to make an even greater, and importantly, a measurable, impact on the environmental behaviour of our staff and our visitors. And, although we made every effort to expose our visitors to multiple conservation messages, we'd always just assumed that our staff were knowledgeable about and committed to conservation; this assumption needed to be tested.

In 2008 SAAMBR initiated a conservation and evaluation programme called 'uSukumani – Making Conservation come alive'. uSukumani is a Zulu word which means 'Make to stand up'. This name was chosen as it aptly described the programme's aim – to help the staff to stand up for conservation and to focus on expanding the conservation role of the oceanarium and Education Centre. It was acknowledged that the programme would be long term and iterative – over time as activities were evaluated, data analysed, results discussed and conclusions reached, these outcomes would be incorporated back into workplace practice and the evaluation cycle would begin again.

In order to ensure that conservation and sustainability initiatives were integrated into the culture of the association, we started a Green Team. The Green Team was made up of conservation champions from all SAAMBR divisions, who met



regularly to discuss ways to make environmentally friendly behaviour easy for staff - both at work and at home. Initiatives ranged from encouraging car-pooling and bringing lunch boxes to work rather than using disposable plastic packets, to competitions between departments to see who could reduce their paper use the most. Larger scale initiatives by the technical department resulted in the installation of equipment which helped to reduce power consumption by 35%, and decreased water use.

In addition to the activities of the Green Team, a conservation training programme was initiated. This took the form of regular presentations. These training sessions ensured that the rationale for the conservation actions were clarified and helped to build enthusiasm and support for the programme.

At the same time as the Green Team were encouraging and supporting staff behaviour change initiatives, the staff of uShaka Sea World and the Education Centre were developing conservation messages for visitors that could be integrated into the daily program, and which would include behaviour change components. Three concepts were identified and integrated into the aquarium interpretation – ‘We are all connected in the Web of Life’, ‘Reduce ReUse Recycle’ and ‘Choose Sustainable Seafood’. The dolphin demonstration was changed to a presentation built around the concept of the ‘Web of Life’, the seal demonstration refocused on ‘Reduce ReUse Recycle’, while the ‘Choose sustainable seafood’ message was integrated into the daily fish feed presentations.

### **The SAAMBR Staff**

This article will focus on one section of the programme – namely the SAAMBR staff. The focus on staff was deliberate; if we were not able to reach our staff with our conservation messages, what chance would we have of reaching our visitors, who generally spend less than three hours in the Park during a visit? After all, it is the staff who interact with our guests – their passion, knowledge and first-hand experience are all critical factors in inspiring visitors. SAAMBR’s focus on the staff aimed to motivate and encourage them to see their work as being more than just a job; to instil in them a sense of purpose. Regardless of position or title, it was important for everyone at SAAMBR to feel that they were contributing to conservation.

### **Methods**

In order to evaluate the impact of the staff component of the programme, a comprehensive survey was designed to assess their environmental knowledge, attitudes and behaviours at the start of the programme (2008) and then again three years later in 2011. A total of 121 staff members from seven different



divisions completed the anonymous survey in 2008, and 171 completed the survey in 2011. The survey was repeated in order to ascertain if the intensive conservation interventions described above had been effective in influencing the staff’s conservation knowledge, attitude and behaviour.

SAAMBR has a staff complement of almost 200 people, made up of full-time, part-time and voluntary staff. Ranging in age from 19 to 65, just over half are female and their experience ranges from marine scientists holding PhD degrees to support staff, some of whom only speak isiZulu. While many have over 10 years of experience with the company, SAAMBR moved to a new facility in 2004 and expanded rapidly, employing 80 additional staff members.

### **Results**

A series of lifestyle questions were asked in order to ascertain the socio-economic profile of staff members. Over the three years between the first and the second survey, the age profile of the staff decreased, associated with an influx of younger people, particularly in the Education Department, and the replacement of retiring staff with younger



staff members more representative of the diversity of the South African populace.

The lifestyle questions revealed that the younger staff members were more likely to entertain themselves electronically, through the internet, or television, rather than by spending time in nature, which was more popular amongst the older staff members. Encouragingly, over the course of the study there was an overall increase in environmental interest, reflected in the percentage of staff who regularly discuss environmental issues at home (57% in 2008 to 65% in 2011) and the percentage of staff who had attended a lecture on an environmental issue (14% in 2008 to 18% in 2011). There was no change in the percentage of staff that read articles or watched environmental programmes on television. The internet increased in popularity as a source of information for staff, with 25% stating that they often visited conservation websites in 2008 compared to 33% in 2011.

A series of knowledge-based questions revealed that there was a slight increase in factual knowledge about the oceans and a substantial increase in the awareness of the Sustainable Seafood Programme (2008 = 63%; 2011 = 75%). Surprisingly, the number of staff who could recall an endangered fish name decreased from 82% in 2008 to 76% in 2011. Disappointingly, all staff had slightly increased their consumption of unsustainable seafood over the three years, clearly demonstrating that improved knowledge does not always influence behaviour. In both surveys, 98% of the staff agreed with the statement "Working for SAAMBR increases my awareness of environmental issues."

While there were no dramatic increases in staff interest or knowledge about conservation over the three year period, there were definite increases in environmentally responsible behaviour. Participation in beach or river clean-ups increased from 34% in 2008 to 49% in 2011, while 28% of the staff reported initiating a conservation action at home in 2011, up from 17% in 2008. Membership of an environmental organisation increased from 67% in 2008 to 74% in 2011. The percentage of staff members who regularly recycled plastic (38% to 60%), tins (30% to 39%) and glass (39% to 45%) increased, as did the use of low energy light bulbs (74% to 84%). Use of the sustainable seafood card increased from 53% in 2008 to 73% in 2011 and more staff grew their own vegetables (35% in 2008 to 47% in 2011).

While the statistics provide an indication of some of the changes, the qualitative comments revealed that overall the programme did help staff members to become more concerned about the environment and participate more in environmentally responsible behaviours. Their comments can be clustered into

three broad categories:

- Awareness. Comments included 'More conscious of the environment.' 'Yes, have learned more about the ocean and what it means to me.' 'I have learned a lot and am proud to be inspired by this organisation.'
- Actions. Most comments related to their behaviour change and how they were communicating their passion to others. 'Practice what I preach by reaching out and going beyond.' 'Talk about environment and animals to friends and family.' 'I am aware and I try to ensure I use every opportunity to make others aware without being "over the top".' 'Try to be a steward for the oceans, helping to change people's perspectives and making them aware of the plight of the oceans.' 'I used to kill animals like frogs with salt, but now I no longer do that.'
- Attitude changes included 'Appreciate our marine life a whole lot more.' 'Have more respect for the ocean.'

In addition, the staff became better ambassadors for conservation with visitors. They could talk from a sound knowledge base and real experience. Most importantly they all understood their role in conservation and knew that, regardless of their role in the organisation, they were helping to save our oceans.

### **Lessons learnt**

Informal discussions with staff revealed that, while the training sessions about the challenges facing our planet, including over-exploitation and climate change, were interesting and built a sound knowledge base, it was the other activities that really promoted the changes in behaviour. The organisational initiatives to save power and water, introduce site-wide recycling and participation in national 'Green Grading' initiatives, together with the focus on staff behaviour at work and at home through the Green Team, created a synergistic effect as the staff could see that the organisation was 'practicing what it preached' and colleagues were 'walking the talk'. A few charismatic and enthusiastic champions helped to drive the programme and keep the momentum going. While this was necessary initially, it was not sustainable. SAAMBR is now integrating these initiatives into the strategic planning of the association to ensure that the initiatives implemented between 2008 and 2011 continue to inspire and encourage the conservation behaviour of the staff of SAAMBR.

### **Acknowledgements**

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# Protecting Pineapple

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## Introduction

Conservation education is the process of influencing people's attitudes, emotions, knowledge, and behaviors about wildlife and wild places (IZE, 2014). It is through the efforts of skilled educators and interpreters that adults and children alike given opportunities to learn more and make informed decisions about their role in nature. Students are increasingly becoming disconnected from the natural world and this necessitates using methods that generate a sense of wonder and stewardship to interact positively with nature (Louve, 2008). As zoological institutions move towards a more active role in conservation, education becomes the vehicle to move the public to support these initiatives both financially and politically.

One method that has been used by zoos is making particular animals available for visitors to touch through petting zoos, or interpretive programming. In many institutions, it is a common belief that being able to have active interactions, for instance touching an animal versus passive interaction by simply viewing it on exhibit will have a positive effect in the choices people make when it comes to conservation attitudes and behaviors. This study was completed to begin to answer the question: Is there is a connection between physical interaction with animals and conservation attitudes? Middle school students in Lufkin, Texas USA were surveyed about their local conservation attitudes toward the habitat of the Louisiana Pine Snake (*Pituophis ruthveni*). There was a percentage of the students surveyed that had touched Pineapple- the pine snake at the Ellen Trout Zoo during an interpretive program. The survey results of those that had touched the zoo's pine snake were compared to those who had not touched the snake. The results showed that students' conservation attitudes that had touched the pine snake were more positive than those that had not.

Most people would agree that if children had the opportunity to touch or directly observe an animal that those children would develop an affinity or compassion toward that animal. In doing so, it would seem that those children would also be more conscious of that animal's threats to survival or its conservation. The key to overcoming the challenges to biodiversity conservation have to begin with our own species (Saunders et al, 2006). We have to understand what some of the psychological forces are that would drive a person to care about animals and try to save those animals from extinction.



From pollution, global climate change, to depletion of the world's natural resources, environmental issues threaten the individuals, communities, and living organisms on the planet. In an effort to address these issues, it is important to understand what motivates people to conserve and preserve the natural environment (Bruni, Chance, & Shultz, 2012). Is using animals in captivity as part of educational services at zoos an effective tool to motivate the conservation of that animal and its habitat? It is important to remember that many people will not get to see these animals in the wild, so zoos are bring the nature to the people.

Development of effective interpretive techniques are important from the aspect of both school aged audiences and managers of zoological institutions. As students are increasingly becoming disconnected from the natural world, there is a necessity to use methods that generate a sense of wonder and stewardship to prepare our youth to live and interact positively with nature. Also, as zoological institutions more towards a more active role in conservation, education becomes a vehicle to move the public to support these initiatives both financially and politically.

## Methods

The Ellen Trout Zoo in Lufkin, Texas uses live animals in many of their education programs both at the zoo and through outreach programming. Several of those animals have been education animals for many years and some of the public recognize these animals by name. The following survey was given to students that live in Lufkin, Texas. The study was comprised of one survey broken into a before and after question survey. The focus of the survey was to evaluate the attitudes of 10-12 year old students concerning the conservation of a local endangered animal, the Louisiana pine snake (*Pituophis ruthveni*) and its habitat- Long Leaf pine tree stands. Pineapple is a Pine Snake (*Pituophis melanoleucus*) and an education animal at the

Ellen Trout Zoo in Lufkin, Texas.

In most cases, children and adults recognize Pineapple and have been allowed to touch him as part of education programs that the zoo offers. Once the before section of the survey/ questionnaire was complete, a photograph of Pineapple was displayed and identified. The students were then asked to complete the second portion of the survey.

### Results:

One hundred percent of students surveyed had visited the zoo. Nineteen of the 20 marked that they had touched an animal from the zoo and responded that it was good experience. The question “Do you “know” Pineapple the Pine Snake? And have you ever been able to touch him?”revealed that 10 out of 24 claimed to know Pineapple. While 14 out the 24 responded that they did not know Pineapple. those 10 that knew Pineapple the pine snake had scores that reflected an elevated awareness in conservation in contrast to the 14 that did not claim to know him. They were also more likely to leave their comments in the additional comments section of the survey. Here are few of those comments:

“I think that trees should be preserved and no one should be able to cut them down”

“Animals are like people and we are destroying their homes by doing this.”

“It affects other animals that live in the long leaf pines”

### Discussion

Most of the time, zoos and aquariums are trying to convey a message of understanding of wildlife and conservation (Street, 2010). The personal benefits of viewing and learning about wildlife are the basis for conservation actions (Manfredo & Driver, 2002). This study focused on effectiveness of zoos using particular animals as education animals for the public to be able to have physical contact. In another study of marine animals, it showed that “providing wildlife experiences that elicit from visitors a combination of affective and cognitive responses to marine wildlife increases environmental awareness, modifies intentions to act and fosters conservation appreciation and actions by visitors”( Zeppel, 2008). Based on the results of the Pineapple the pine snake study, there is a significant difference in the feeling and attitudes of children on conservation issues based on whether or not they have come in physical contact with zoo education animals. This research would benefit from the administration of more surveys with a wide variety of education animals i.e. mammals, birds, insects and amphibians. It would be beneficial to zoos and aquariums to evaluate their interpretive educational programming including allowing the public to touch animals to determine efficiency both qualitatively and financially in order to persuade

children and adults to invest positively in our natural world.

### Acknowledgements

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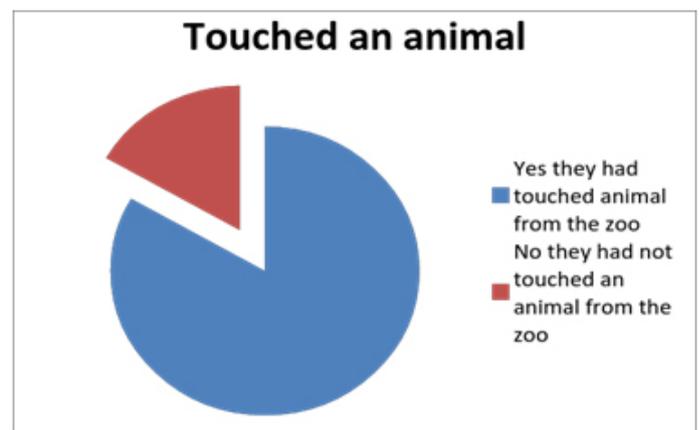
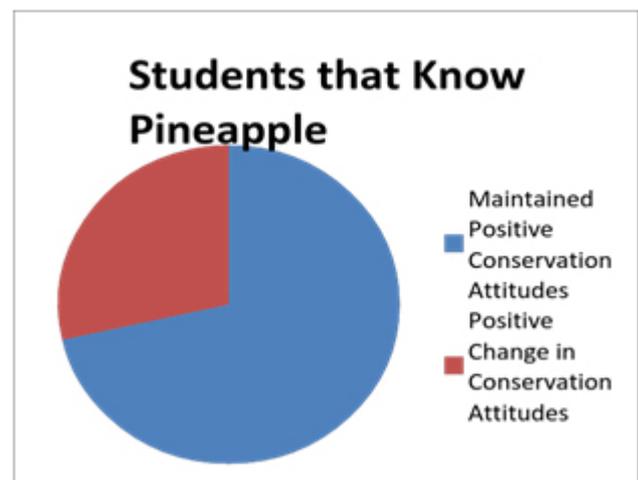
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# Evaluating Night Stalk: A nature-based community engagement activity designed to motivate conservation actions

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1. Provide an enjoyable wildlife spotlighting nature experience;
2. Increase public awareness about their local wildlife habitats, and native and introduced species;
3. Foster pro-conservation actions.

Night Stalk is also a citizen science and pro-conservation behaviour. The data collected go into a nationwide database that can be used by community and conservation groups to monitor wildlife population numbers and distributions.

## Introduction

As zoos strive to motivate visitors to engage in wildlife conservation behaviours, it becomes increasingly important to identify educational and motivational strategies that lead to pro-conservation actions. Zoo visitors' willingness to engage in wildlife conservation behaviours can arise from: (1) an emotional connection with the animal (Skibins and Powell, 2013), (2) an awareness and understanding of the threats facing animals, and (3) knowing how the requested action can help (Smith et al., 2010). Positive, direct experiences with nature and wildlife can foster an emotional connection leading to pro-conservation action (Nisbet et al., 2009). This suggests that zoos could be effective in raising wildlife conservation awareness and actions by promoting opportunities for positive nature experiences around wildlife.

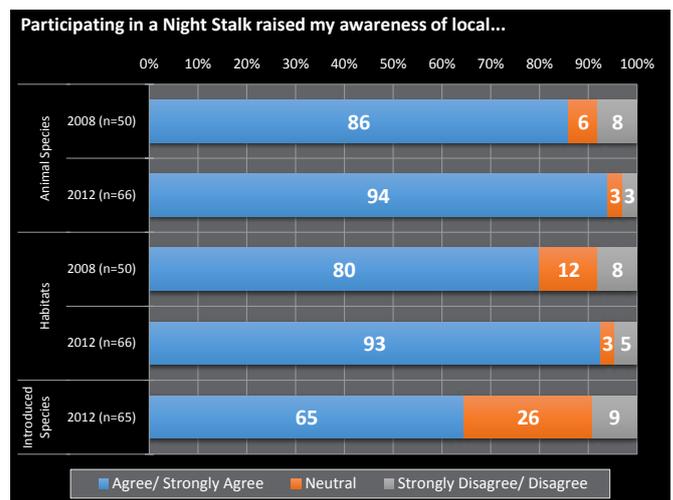
Expanding on these ideas, Perth Zoo developed their Night Stalk program. Each year, since 1999, from 1 September to 16 October, people are invited to go into their local nature area (anywhere in Australia) at night-time (when most native Australian mammals are active), look for wildlife, record what they see, and report it back to Perth Zoo. To participate, people can either join a hosted event (with a guide), or they can go on their own.

Night Stalk is a community engagement initiative designed to:

In this paper, we explore key findings from our three-study evaluation of Night Stalk. We sought to (a) determine how well Night Stalk is meeting its three community engagement objectives, and (b) maximise participation rates.

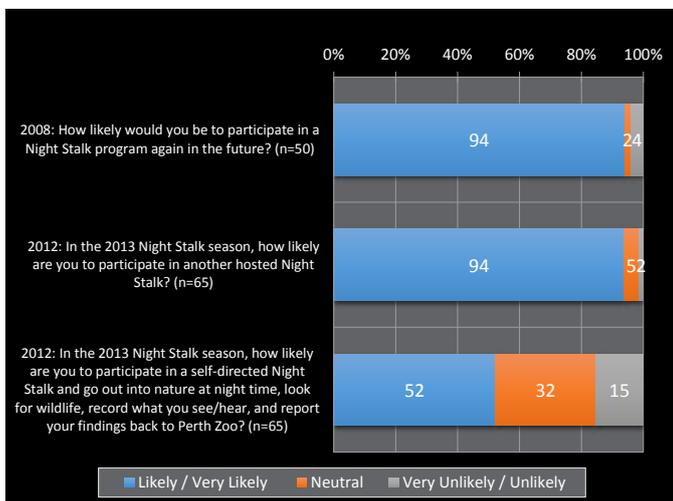
## Study 1: Does Night Stalk meet its objectives?

In February and March 2008, all 125 known email addresses of past Night Stalk participants were invited to complete an online survey designed to assess Night Stalk objectives. Fifty adults completed the survey (40% response).



Respondents indicated that the Night Stalk program met its three community engagement objectives. Respondents reported that participating in a Night Stalk raised their awareness of local species (86%) and habitats (80%). Participation was also linked to future conservation actions and intentions. Since last participating in a Night Stalk, 61% of respondents reported taking part in some form of conservation action (e.g., educating local residents about the importance of conserving wildlife, planting native





trees, and installing nesting boxes). Nearly all respondents (94%) made commitments to future conservation actions by stating that it was likely/very likely that they would participate in another Night Stalk in the future. This commitment to future participation could be in part because they thought participating was easy (90%). Collectively, these findings suggest that for these respondents, the program was successful in promoting a positive awareness-raising nature experience that led to a commitment to future conservation actions.

Knowing that the program objectives were met, motivated us to strive to increase participation numbers. Finding that past participation was linked to a high likelihood of future participation, we sought to motivate additional first-time participants.

### Study 2: Attracting more participants

To motivate Perth Zoo visitors to participate in a Night Stalk during the 2011 season, we developed an informational and motivational brochure about the program to distribute at the zoo. We followed a 4-step process for the design and implementation of a communication strategy to promote conservation behaviours (Ham et al., 2009).

Step 1. To maximise the persuasive potential of the brochure, we first identified a suitable message for the brochure that was likely to increase the number of people intending to participate in a Night Stalk. Using an interview with 35 adult zoo visitors and a follow-up quantitative questionnaire (269 adult visitors), we discovered that people who held the belief “if I participate, I will have fun” were more likely to intend to participate than those who did not hold this belief. Promoting this belief is likely to result in more people intending to participate.

Step 2. Because this belief also aligns with Night Stalk’s core objective to provide a positive nature experience, we designed the Night Stalk promotional brochures to highlight the belief that participating is fun.

Step 3. Throughout August (the previously established Night Stalk promotional season), visitors were invited to read a brochure and then

complete a questionnaire assessing their intentions to participate in a Night Stalk. A total of 608 adult visitors completed the questionnaire and gave us their telephone number.

Step 4. After Night Stalk season ended, all 608 respondents were called to: (a) determine if they participated in a Night Stalk and (b) identify the factors that influenced their decision to participate. Interview questions were standardised using a pilot study. A total of 411 respondents reported whether they went on a Night Stalk (68% response), and 359 of them completed the interview (59% response).

The pilot interviews revealed that some respondents (even after having been informed about the program) were not clear about which specific actions they had to take to count as a Night Stalk participant. In response, we identified the four actions that are required to complete a Night Stalk (Figure 3). In the actual study, we asked about partaking in each of the four Night Stalk actions.

Results showed that participation declined with each subsequent Night Stalk action. Fifty respondents reported completing the community engagement actions of going into nature at night and looking for wildlife. Ten of them recorded what they saw; three of these completed a Night Stalk by reporting their sightings to Perth Zoo. Reasons for the declining rates of participation with each subsequent action included a lack of interest in the citizen science aspects and not knowing enough about how to complete the required actions.

By asking about each Night Stalk action, we identified an additional 47 respondents who were partaking in the community engagement aspects of Night Stalk. Because they were not engaging in the citizen science aspects (by recording and reporting their findings to Perth Zoo), these individuals were not counted as Night Stalk participants. These findings showed us that: (1) our current method for measuring Night Stalk success was likely to under-represent the numbers of people partaking in the community engagement aspects of the program, and (2) Night Stalk participation counts could be increased by providing additional information about how to complete the citizen science actions.

While 108 respondents (27%) had intentions to participate in a Night Stalk, only two (2%) of them actually did. When non-participants (n=357) were asked why they decided not to participate, the most common response was that they wanted to participate but were not able (n=155). After having other priorities or not enough time (reported in 39% of interviews), the two most commonly mentioned reasons for not participating were that they forgot about it (mentioned in 19% of interviews) and the belief that the activity is not appropriate for their family with young children (e.g., it happens after their children’s bedtimes; 18%). To help people remember, the Night Stalk promotional

period now coincides with the Night Stalk season. Families with young children are less likely to participate in night-time activities. Participation could be increased by broadening the scope of Night Stalks to include looking for wildlife during the day, when families with young children are more likely to participate.

### **Study 3: A more specific evaluation of Night Stalk**

In Study 2, we learned to be more specific in how we define a Night Stalk by explaining that it involves four actions. In 2012, sixty-six adult participants at seven hosted Night Stalks completed a questionnaire designed to re-evaluate the Night Stalk program to more specifically determine how the program is meeting its community engagement objectives.

Results indicate that the program continues to achieve its community engagement objectives. The majority agreed that participating in a Night Stalk was fun (97%), raised their awareness of local native (94%) and introduced (65%) species and their habitats (93%).

Participation was also linked to past and future conservation activities. Nearly all respondents (97%) reported prior involvement in a program that involved going into nature and recording the wildlife they saw and/or related volunteering in nature protection activities (Kaiser and Wilson 2000). The majority of participants reported that during the 2013 Night Stalk season it was likely/very likely that they would participate in another hosted Night Stalk (94%) and a self-directed Night Stalk (52%).

### **Conclusion**

We determined that the Night Stalk program is achieving its community engagement objectives. It provides opportunities for positive nature experiences that raise awareness of local wildlife and habitats and are linked to future conservation intentions and actions. This evaluation demonstrates a successful role zoos can play in promoting wildlife awareness and conservation actions even amongst their broader community.

By identifying key factors influencing decisions to participate in a Night Stalk, we adapted the program to better suit public needs to increase participation. We have delayed Night Stalk promotion until closer to the start of the season. We have refined our explanations of Night Stalk to describe all four actions required to be counted as a Night Stalker. In doing so, we have recognised that only two of the four actions are required to meet the community engagement objectives, and that more people are partaking in these community engagement actions than are being counted using current methodologies. We are now considering other avenues for monitoring participation of the

community engagement actions.

Our monitoring and evaluation of Night Stalk is an ongoing process. Further research is needed to determine whether (a) Night Stalk participation influences decisions to partake in subsequent conservation actions or (b) Night Stalk participants are already more likely to engage in conservation actions. We continue to try to maximise participation rates by seeking to understand public perceptions of Night Stalk and employing persuasive communication strategies to tailor the program and promotional campaign to meet the needs of potential Night Stalkers.

It is our hope that the demonstrated success of Night Stalk will inspire other zoos to develop their own program to motivate communities to engage in conservation actions in their local area. We recommend these programs implement a similar motivational and evaluation approach that:

- Employs best practice protocols for designing promotional materials to motivate action;
- Understands what the target audience thinks about the program and doing the behaviour; and
- Is ongoing while remaining flexible and adaptive to the insights and needs of the target audience.

By understanding our programs from our target audience's perspective, we are able to make the necessary changes to maximise participation and the likelihood for future conservation actions.

### **Acknowledgements**

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# Learning by designing learning objects in zoo and wildlife education

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## Introduction

Zoo education can be considered the pioneer in vocational agricultural education, due to the fact that it is the first to integrate the principals of environmental education with vocational and continued education concepts. The aim of this study was to find out, if the design and construction of learning objects could be used in environmental and vocational education settings. The approach to this was qualitative. Educational methodology is based on "Forest Case Studies", abbreviated FCS, originally developed for learning in forest education. It contains elements of learning at school as well as forest related museums or collections and of course forests (Anon 2010, Enkenberg, et al. 2010, Enkenberg & Vartianinen 2010).

During the course of this project I adapted it for vocational education in the fields of animal sciences and wildlife education.

## Methodology

The project started in 2011 and was completed in 2013. First the method was tested in a regular setting with a small class of 10 students in grade 9. After this there were two stages of an application in vocational classes. The first stage was set up to gain firsthand experience on using FCS for teachers and students and find differences between FCS-oriented approaches to learning versus the regular way of teaching with a class of 14 and control group of 13 students. Here written tests and group interviews were used to gain data on the effectiveness. The second stage was for the actual research and used the results of exams and group-interviews for information. The method was compared to teacher-centered and active learning environments and used 125 students.

## Method FCS

During the first, articulation, phase the students are shown a phenomenon and formulate the driving question for the coming other phases. It is important, that the students find this question on their own. The students normally work in groups. In the next phase, the designing phase, the students conduct a literature review in the library or the internet and plan a mandatory visit to a place of learning (in this case a zoo). They choose real objects to study and start designing the structure. In the third collecting phase they actually visit the zoo, interview experts and start collecting data by doing their own research. This might be behavioural studies or whatever is appropriate for the phenomenon. The fourth phase,

the construction phase, consists of organizing the data acquired through the research and visits to the learning environment. Through this they construct the learning object and find a possible explanation for the phenomena. Due to the fact, that the learning subjects in this research are animal related, the method should be named Animal Case Studies (ACS).

## Test

Before using the method in the planned setting, I tested it for what it was intended for - environmental education. A group of 10 students, 9<sup>th</sup> grade (high/grammar school), had been working on a project to find out how many wild cats *Felis silvestris* were living in the local forests surrounding their hometown together with the local bureau for nature conservation. The students had been collecting genetic samples for two years. The hair samples were acquired from noninvasive hair snares, set up together with a forest officer and a conservation biologist. The pupils expressed a strong doubt on the reliability of the snares during an interview, due to the fact, that they were told, that this was the best way to gather the necessary material.

During the one year project we worked on this issue, starting by talking to environmental enrichment experts from the Hanover Zoo, studying big cats that were given scent enrichment in their enclosures and trying these scents on my own two Turkish Angora. Later constructing and trying different kinds of hair snares and finally collecting the samples in the wild. The whole project was considered very motivating for the students and resulted in a high level of trust in the results.

## Study

To test the method in a vocational education setting we chose two groups of students that were both taking part in a one-year full-time education program in animal care and wanted to become animal keepers. The group taught through ACS consisted of 14 students (2, 12), aged 16 to 19 years, eight of them having special educational needs. These were considered particularly weak by the teachers and given a thorough methodology training in preparation of the project. The control group numbered 13 students (2, 11), aged 16 to 21 years, all of them from regular schools. Both groups had three weeks for the project and visited a local zoo in the beginning of the module. During the first day on the project test 1 was written to gain some insight on the existing knowledge of the students on the subject. At the end of the three weeks a second test was conducted. The third and final test was done six weeks after the students completed their projects.

None of the tests was announced, so they were unable to learn for these.

The two teachers responsible for the module worked as a team and were able to monitor the teacher behaviour of each other. The control group was given only one opportunity to visit the zoo, had no possibility to talk to experts and could rely only on the material given in the text books, while the ACS group could use all of these and were given semi-scientific access to scientific texts on the issue.

The results show, that the ACS group had very little knowledge in the beginning of the project, while the control group had a better average knowledge on the topic as predicted. The second test was more complex and tested the knowledge on those contents the control group definitely had in the lessons, while the ACS group, with the higher self-responsibility in constructing the learning process, may only have learned this while designing the learning objects. Surprisingly they performed much better at this test, compared to the control group. What is even more interesting is the fact, that learning by designing and constructing offered an increase in learning even though the project was over, as shown by the last test, similar to former studies on the effect of environmental education.

Beyond the mentioned effect on learning, the method seemed to induce a motivational increase for the students. Both groups included two pupils with an unusual high number of days spent skipping school. In the ACS-group no new days missing were counted during the project. That changed to the former behaviour when the students went back to "normal" lessons.

Furthermore the students in the ACS-group, who had preferred the internet for acquiring knowledge and solving tasks, changed to more scientific literature in the process; thus offering a solution for the problem in vocational agricultural education, that many learners are not able to use the literature available for self-organized continued education (Lehmann 2005).

The study might confirm, that ACS could offer an interesting approach to environmental and vocational learning in zoo-related educational settings. The competence and knowledge gain, by constructing and designing learning objects, improved gradually throughout the process and was considerably increased even beyond the run time of the project. On the other hand those who had experienced a regular learn-setting showed the "classical" symptoms of students only learning for a test and forgetting everything afterwards, which resulted in a considerable decrease in the knowledge. Confronted with these results the control group were asked to learn this method and be taught this way in the next part of their education.

## Discussion

In forest-related learning environments the designing of learning objects is considered to be an elementary aspect of the educational concept (Pichler 2009). The influence of getting in contact with an inspiring expert seems to have a significant influence on later perceptions of the learner (Innocenti & White 1993, Hattie 2014). Designing of learning objects in a learning-environment where teachers and zoo educators work together as a team seem to be a sustainable and learner-oriented way for acquiring elementary competences and knowledge according to the principles of the WAZA conservation strategy (WAZA 2006). Phenomena suitable for this method might be everything, starting from evolutionary questions, human-animal-relationships, hibernation, eco-geographical rules, reproduction and maternal or paternal care in animals.

ACS and creative learning in a "school teacher - zoo educator - team" seem to be particularly suited for our aims in teaching students about zoos, wildlife and related issues.

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# Conservation education; a practice for everyday life

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“It’s vacation time... let’s go camping in the woods!” This has become an oft repeated scenario in the present times where parents and even schools take children for trips and camps to natural spaces for picnics and holidays. This has come to become a popular way for the urban populace to de-stress, by being in nature and living a

“different” life for a couple of days. Facilitators help them get an experience of a lifetime- walk into the wild, observe the bountiful nature and click beautiful pictures. But what happens next? One goes back to the regular life seemingly away from all the new found knowledge and sensitivity. Till they return for another camp! What does it achieve? Does it inculcate ecological sensitivity among those who may have lost it by virtue of their lifestyles over generations? Empirical data on climate change, rapidly dying out of multiple species of flora-fauna and health patterns of humans does not suggest so. May be a little more is required.

What is needed is a new ecological sensibility (Daniel Goleman,2012). To understand the ‘butterfly effect’ of what we do and/or not do at our individual levels on an everyday basis. Our everyday systems of energy use, transportation, agriculture, food, industry, commerce has a direct impact on the planet’s health. It is no

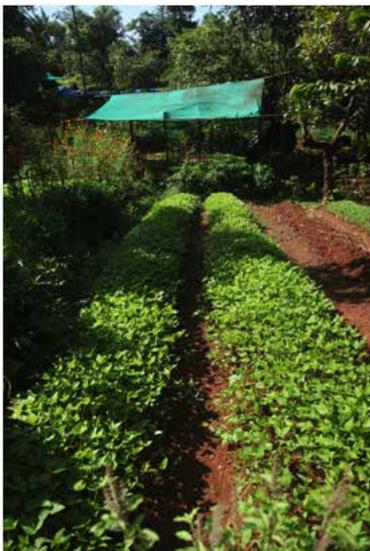


doubt difficult to fathom- how will packaged water affect the lives of reptiles in a forest thousand miles away? But it does, and it is time that we begin to look at these webs of connections and also understand them. The ecological foot print is no more a concept only for environmentalists to juggle with. It needs to be part of the Conservation Education at all levels. A young person with her/his mind awakened has a far better scope of being a responsible adult.

All indigenous cultures across the world have this as the base for the practices of resource use. They see their use of resources as creating ecological impact in the natural world of which they are part. Things changed, as the post industrial revolution gave birth to cultures that are extractive and exploitative. Now we live in cities and suburbs where we meet most of our needs from resources all around the world and the impacts are too far away for us to fully recognize. What is left is a sporadic superficial linking with the natural environment. Building on this understanding there are some grassroots interventions in the field of ecological education and sustainable living.

One such intervention is GaiaMitra (Friend of the Earth) in Gulduve Village in Maharashtra, India. This initiative practiced at the farm (Gaia Farms) where children of all ages come for different courses; all designed on the principle of sustainable lifestyles and ecological well-being.

GaiaMitra is an initiative trying to strike the balance between Ecology- Economy- Society in a place which is biodiversity rich yet on the brink of losing most of it. Gaia Farms is a pioneering site for GaiaMitra’s social interventions on the guidelines of Regenerative Economy- Conserved Ecology- Holistic Wellbeing for the earth and its components. The farm is based on Permaculture



*Gaia Organic Farm and floral documentation*



Design and is conscious of the carbon footprints caused by human interface and balance it by new indigenous plantations. It

is involved in building with natural and recycled materials, organic farming, conservation of indigenous trees and documenting fauna- all with community participation. It is a space for knowledge exchange and considers the trees on the farm as the most valuable and real resource for sustainable living. The education initiatives of the farm primarily focus on developing empathy and understanding for all forms of life. The engagements are at various levels starting with primary School, children between 10 to 15 years.

The school children along with their teachers are encouraged to explore the natural world and study the eco-systems around. They learn about natural farming its benefits and apply the knowledge by raising their own organic vegetable garden. Youngsters (15 to 19 years of age) are part of a fellowship program called 'Learn and Earn' where they get introduced to practices of sustainable lifestyles and livelihoods- Ecology, Natural Building, Organic Agriculture and Ecologically Sensible Hospitality. They are introduced to the cause and effects of man-made changes in the natural world. They are encouraged to make the connections of regular practice of everyday life, for e.g. creating indiscriminate amount of waste without proper ways of disposal and pollution in the river that flows by the village. Students are trained in building with locally available natural materials.

The visiting school children, as part of their camps, learn about the environment and also are involved in helping reduce a footprint by learning how to make bricks out of used plastics (by shoving them into plastic bottles). This is something they can do even in their homes.

The learners are pushed to come out of their comfort zones and do things differently. Only then one can understand how nature sustains itself. Conservation practices are embedded into the everyday life practices. The learners are encouraged to live it as the farm itself lives it every moment. The invisibles are made visible and the obvious is seen as not-so obvious.

For anything to be viable in the scope of the 21st century life and expect it to be sustainable, it has to be ecologically sensible. We need to understand that the living systems exist by being in inter and intra systemic relationships. The earth's eco-systems cannot be ignored in the blind flow of our everyday lives. For we all know, 'Nothing is Free; Everything is a Tree'- Biomass Prime

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# Online resources presented at the 22<sup>nd</sup> conference of the International Zoo and Aquarium Educators Association [IZE]

September 2<sup>nd</sup> to 6<sup>th</sup>, 2014. Ocean Park, Hong Kong.

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In September 2014, Ocean Park, Hong Kong, held the biennial conference of the International Zoo and Aquarium Educators Association. This event's objective is to gather the educator's community to share experiences and strengthen the cooperation and links on conservation education.



This time the conference had a pre-conference workshop on September 1<sup>st</sup> and 2<sup>nd</sup> with the Community Based Social Marketing Workshop taught by Dr. Doug McKenzie-Mohr where he proposed the use of this tool to promote environment friendly behavioral changes. Dr. Mckenzie has a publication entitled *Fostering Sustainable Behavior*, available free online at the website: <http://www.cbsm.com>



Tom Mehrmann Chief Executive of Ocean Park, offered the welcome message, followed by the president of IZE, Rachel Lowry who explained the ultimate goal of zoo based education. The theme for the conference was: Education in zoos and aquaria, what does success look like and how do you measure it?.

The keynote presentations were given to all participants while presentations by members were delivered simultaneously, divided into ten sessions. These presentations are available in the website: <http://www.oceanpark.com.hk/ize2014/en/call-for-papers.html>

The work was performed in poster, open work and two workshop sessions. These activities addressed the importance of evaluation to measure the performance of the education programs. The approach was

multidisciplinary since there were projects for educators, teachers, students, keepers and exhibit designers.

One of the workshops dealt with the game in nature, highlighting the importance of unstructured play and the value of the zoo as an ideal place to promote it. This workshop offered free tools available online, on the sites:

[www.naturecircles.org](http://www.naturecircles.org) and

<http://www.childrenandnature.org/movement/naturalfamilies/>

with the manuals translated into English, French, Chinese and Spanish

Another of the workshops promoted tools to evaluate educational programs both qualitatively and quantitatively. This workshop was very dynamic and showed a wide range of techniques from very simple and traditional to some that apply new technologies such as Plickers ([www.plickers.com](http://www.plickers.com)). A tool that allow teachers to obtain formative assessments in real time and involve students in a critical thinking scheme using a mobile device that generates graphs of the results simultaneously on a computer.

This application works by reading a QR code



that the students place in different positions depending on their response and it sends the information to the computer to deliver the results as a graph. Formative assessment is achieved when students can see their answers and compare it with that of their peers.

Finally, Dr. Markus Gusset, Executive officer from WAZA, presented the results of its evaluation exercise of the educational impact of zoos and aquariums: [http://www.waza.org/files/webcontent/1.public\\_site/5.conservacion/un\\_decade\\_biodiversidad/WAZA%20Visitor%20Survey%20Report.pdf](http://www.waza.org/files/webcontent/1.public_site/5.conservacion/un_decade_biodiversidad/WAZA%20Visitor%20Survey%20Report.pdf)

Similarly, Tiago Pinto-Pereira presented the materials that are available on the website of the Decade of Biodiversity, with a strategic plan available in several languages: <http://www.waza.org/en/site/conservacion/un-decade-on-biodiversidad> and three informative videos, addressed to zoo visitors about the value of these institutions in biodiversity conservation. They are available in several languages at: <https://www.youtube.com/user/BioDiversityIsUsWAZA>

Bioparque Temaikén [www.temaiken.org](http://www.temaiken.org) from Buenos Aires, Argentina, will hold the 23rd biennial conference in 2016. The education website for Temaikén is: [www.edufundaciontemaikén.org](http://www.edufundaciontemaikén.org)



