A note from the IZE President

Stephen McKeown
Head of Discovery and Learning | Chester Zoo | United Kingdom

It’s one of those years where you sometimes hesitate before switching on the TV for fear of being thoroughly depressed by all that is going on in the world. Somehow everyone, governments included, seemed to forget that economies go through cycles and that we would arrive eventually at another recession. What’s interesting I think is how people’s behaviour changes during times of economic stress.

The phenomenon of ‘staycating’ (not yet in the Oxford English Dictionary thankfully) is where people, to save money, instead of going away for a holiday, stay at home and do day trips with the family. Holidaying at home in other words. I believe the word passed into popular usage in the USA in May of 2008 when rising fuel prices discouraged people from travelling.

Staycating is certainly beneficial to the environment and the local economy if people, instead of jetting off to some long-haul destination, stay in their own area. There’s evidence too that self-sufficiency is making a comeback with families growing more of their own food, baking their own bread etc. There’s a ten year waiting list for allotments (patches of land you rent from the local authority to grow fruit and vegetables on) in some parts of London. Many people I know have become much more conscious of their energy consumption too with domestic energy monitors being the latest ‘must have’ gadget here.

All of this is good, not just because we should probably be doing all of those things anyway, but because it creates an atmosphere in which people are ready-primed for receiving messages on conservation and sustainability. There’s little doubt that zoos in many areas are benefiting from the recession with staycations (I promise that’s the last time I’ll use that word) looking for a good value day out. So we will all, hopefully, have good numbers of visitors in a receptive mode for our messages!

Many of these messages are good ones too. In this Year of the Gorilla with a census conducted in January showing that the population of mountain gorillas has risen by 12.5% but of course that situation could change very easily unless protective measures are kept in place.

And well done to the Government of South Africa who as I write this has just announced that it will create a 180 000 km² Marine Protected Area around the remote Prince Edwards Islands in the Southern Ocean, home to 450 000 king penguins, 14 species of petrel and 33% of the world’s sub-Antarctic fur seals. What an inspiring example of real commitment to the environment! Let’s hope other governments follow suit.

On that happy note I’ll finish and wish you all well in your education programmes across the world. I look forward as ever to meeting some of you at least during the coming year!

Silverback Akili and visitors.

Photo © Ronald van Weeren / Artis, Royal Zoo Amsterdam

Editorial

Natasha Silva
Senior Education Officer | Artis, Royal Zoo Amsterdam | The Netherlands

Zoos can be a powerful medicine in alleviating children and adults – living in an increasingly urbanised society – from the nature deficit disorder. At a time of great environmental, economic, and cultural transformation in our relationship with nature, there is a pressing need to research, understand and distinctly define the role of zoos in this context.

Conservation psychology, one of the latest directions in psychology, introduces new ways of thinking and facilitating people’s experience of and relationship with nature. It also harbours important tools for zoos, crucial for the promotion of a sustainable relationship between humans and nature.

Will zoos in the near future become increasingly significant sites for ecological conversion? Some zoos are already paving the way in this area and serving as inspirational role models to the community – as the many outstanding articles in this issue attest. Moreover, zoos are also forwarding conservation education in situ.

Concurrently, there’s an increasing focus on accountability amongst the media, funders and the general public. Hence evaluation of impact on the visiting public is also moving to the forefront of zoo operation – and rightly so. We must walk our talk and prove our effectiveness.

So, zoos may become increasingly outstanding sites for bringing people in touch with (local, regional or ‘exotic’) nature. Nevertheless, the question arises: do zoos need to not only draw in the already biosensitive or biophilic visitor, but especially focus their attention on reaching people who are most in need of transformation?

An increasing alienation from nature could entail an increase in biophobia… Whichever way, we have our work cut out for us!

Silverback Akili and visitors.

Photo © Ronald van Weeren / Artis, Royal Zoo Amsterdam
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Gorillas - What Else?

A new era of cooperation between WAZA and IZE

by Gerald Dick  EXECUTIVE DIRECTOR | WORLD ASSOCIATION OF ZOOS AND AQUARIUMS (WAZA)

Education and awareness-raising is one of the priorities of zoos and aquariums. This is not primarily the case because it has to be part of an attractive events list of institutions, but specifically because of the well known chain of cause and effect: conveying a message does not mean it is heard, hearing a message does not mean it is understood and understanding a message does not mean it leads to action. What we need today is more action!

By strategically fostering partnerships with other international organisations, WAZA is attempting to create synergies in order to support the conservation and education work of zoos and aquariums. Looking at the worldwide decline of biodiversity, the impact of climate change, the challenges of creating a more sustainable world and taking into account limited resources, makes this approach of joining forces imperative! It is therefore with great pleasure and satisfaction that WAZA and IZE have agreed on a closer collaboration from 2009 onwards. And what would be more obvious than proceeding to work jointly on an education manual and promoting conservation internationally with ‘Year of the Gorilla’: gorillas, what else?

The ‘Year of the Gorilla’ is an international joint activity of the following partner organisations: UNEP/CMS, The Convention on the Conservation of Migratory Species of Wild Animals, the UNEP/UNESCO Great Ape Survival Partnership (GRASP) and the World Association of Zoos and Aquariums (WAZA). Under the auspices of CMS, an agreement on gorilla conservation has been established. WAZA supported the development of this gorilla agreement and holds a Memorandum of Cooperation with CMS. This formal agreement (which is an international treaty on gorillas) came into force in 2008. During the conference of the parties in December 2008 in Rome, all action plans for the four gorilla subspecies were adopted and simultaneously
the 'Year of the Gorilla' was launched. The official website www.yog2009.org contains all background information as well as upcoming events planned in zoos this year. Over 100 zoos have registered via WAZA as supporters of this international endeavour. As an addition to the to the leaflets and other more technical information, we have provided an education manual called 'All About Gorillas' which can be download from the WAZA www.waza.org, IZE www.izea.net and YOG2009 websites. The purpose is to help convey the message that gorillas are wonderful creatures, they are endangered and we can do something to help them survive!

The main goals of ‘2009: Year of the Gorilla’ are:

– Encourage strategic approaches to gorilla conservation that are practical, easily manageable and accessible to many people.
– Raise funds for gorilla conservation action.
– Create awareness among people of ecosystem services (including carbon sequestration and storage) and illustrate the intrinsic value of flora and fauna.
– Provide income opportunities as an alternative to poaching, logging and mining through capacity building (e.g. by training forest workers and raising awareness on the importance of sustainable approaches for their own livelihoods).
– Educate the wider public on gorillas and the threats they face.
– Educate on the potential of ecotourism and carbon finance.
– Encourage cooperation between zoo-based and field-based conservation bodies, as well as wildlife rangers and forest managers to improve species preservation.
– Improve the monitoring of protected areas by utilizing technical capacities (e.g. use of camera traps and remote sensing equipment).
– Improve the capacity of government wildlife agencies for setting up anti-poaching campaigns by providing information and equipment as well as training.
– Support rangers in their activities.
– Promote cultural attitudes and traditions that are conducive to the conservation of gorillas and other great apes (e.g. taboos on hunting them and sustainable approaches to resource use).
– Promote the concept that sustainable development must be compatible with gorilla survival across the species range and even outside of protected areas.

While many zoos are focusing this year on gorilla conservation, preparations are already underway for next year’s International Year of Biodiversity 2010. After a very successful joint project for this year’s gorilla theme, IZE and WAZA are teaming up again for another education manual. It will focus on zoos’ potential in communicating biodiversity in 2010.

This manual, which should be available in December 2009 as a free download, will be a comprehensive reference book on biodiversity and a valuable resource for educators. Several topics will be discussed such as: “What is Biodiversity and what’s it ever done for me?” Threats, solutions, zoos’ potential, a recipe book, many of examples of games, interactive activities and programmes will be featured. In addition, the manual will contain information on further reading and resources.

The IZE/WAZA Biodiversity Resource Manual will be an extensive instrument for you to help zoo audiences learn about and engage in biodiversity activities.
We are in the midst of the world’s sixth major extinction event with vast numbers of species being lost in a geological blink of an eye – frequently before we are even aware of their existence.

Many of these extinctions are tied to the activities of one species; humans.

Humans are threatening the survival of other species in a variety of ways, from reducing habitat to polluting the environment. Many of these threats can be linked back to the large number of people and their consumption patterns; the amount and type of resources consumed. For example, between them, North America, Europe and Japan make up 15% of the world’s population but are responsible for up to 80% of wood resource consumption, toxic pollution and international travel (Gladwin et al. 1997; Mann 2000).

Addressing human consumption patterns is a critical part of conservation as without doing so, much of the on-ground conservation work will be in vain as climate change and pollution create dramatic changes in the landscape. Even today, events that were thought of as once in a hundred year events are becoming standard with devastating effects. Without a change in the way we as humans think and behave the continued existence of many species remains tenuous.

As a species we already have the knowledge and skills to greatly reduce the impact of our activities on the world. As individuals or communities though, there is often a lack of action towards solving the problem. Part of that is related to a lack of knowledge about issues and solutions, which zoos are helping to address through their education programs. The major problem though remains in quickly and effectively translating knowledge and attitudes into pro-conservation behaviours. And this is where Conservation Psychology comes into the picture (Saunders 2003).

Conservation Psychology

Conservation Psychology is a relatively new field that aims to discover how to change non-sustainable human behaviour in order to protect the natural environment and conserve diminishing natural resources. It draws principles from all areas of psychology, and facilitates collaboration with practitioners from other fields including ecology, biology and social science.

Insanity: doing the same thing over and over again and expecting different results.  

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by Dr. Carla Litchfield (Lecturer in Psychology) University of South Australia & (Conservation Psychologist) Conservation Ark | Zoos South Australia and Dr. Wendy Foster Science and Conservation Coordinator | Conservation Ark | Zoos South Australia
Paleolithic ‘man’ in a rapidly changing world?

Over many generations, evolution honed our ‘automatic’ responses and emotions to help us cope with day-to-day survival. Recent rapid advances in technology have meant that these hard wired Paleolithic responses no longer serve the same ‘survival’ or adaptive role. These hard-wired physiological responses can play a vital role in creating a better and more sustainable world. On the ‘flip-side’, they can also be utilized in morally questionable ways, such as in psychological operations during wars and by advertising executives to promote sales of products.

Psychological principles of attitude and/or behaviour change underpin our ‘super-sized’ patterns of consumption or addiction, and can be harmful to our physical or psychological health (e.g. smoking, gambling). Persuasive advertising can ensure that products known to be harmful continue to be purchased, because they are associated with images or people considered to be ‘cool’ or ‘sexy’ or successful. Similarly, corporations sometimes encourage skepticism about research findings that link their products with harmful effects, such as global climate change or detrimental health effects.

In 2007, fashion giant ‘Diesel’ increased sales by draping scantily clad models in iconic landscapes altered by global warming. Global catastrophe had been transformed into sexy fashion chic for monetary gain. Using catchy jingles, images of attractive or famous personalities, and bombarding people with repetitions of sound or image ‘bites’, is using principles of persuasion to change behaviour.

Some advertising programs use psychological techniques to encourage specific responses beneficial to their business without regard to, or understanding of, the long-term consequences to other people or the planet.

These same principles of psychology can also be used for ‘good’ though, whether to facilitate behaviour change in individuals, such as overcoming an addiction (e.g. use of behaviour modification or Cognitive Behaviour Therapy), or to facilitate behaviour change in communities, such as reducing drink driving, speeding or water usage (e.g. use of Public Service Announcements).

To achieve sustainability, we need behaviour change to occur at both the individual and community level. Psychologists have long known that awareness raising and changing people’s attitudes do not always lead to behaviour change. Behaviour change is influenced by many factors including the person’s upbringing or social environment (peers, family and culture) and belief in the ability that s/he can make the change.

So how do zoos fit into this picture?
The fundamental role for zoos is to act as powerful centres for conservation. Zoos have an obvious role providing an insurance population for threatened species, but zoos also attract a large number of visitors, from a cross-section of the community, which makes them well placed to work on the human side of conservation as well.

The messages delivered by zoos to their visitors need to be considered carefully to ensure their effectiveness.
is not reduced by focusing only on the things that are wrong without providing options for change. Zoos and other conservation agencies have the opportunity to develop effective campaigns directed at changing behaviour, whether reducing consumption of resources (water, energy or meat), fostering volunteering or other ‘helping’ behaviours, or promoting development and use of more sustainable products or technologies.

At Adelaide Zoo a new discovery centre has been opened in the Westpac Envirodome (www.envirodome.org.au) which utilizes a variety of activities to provide people with an understanding of their connection with, and impact on, the world around them. An example of a vital natural resource that is often taken for granted is water. To help build an understanding of the balancing act needed to allocate water resources in the modern world, a water sculpture was created, with water ‘raining’ intermittently from the ceiling above. This sculpture provides zoo visitors with the opportunity to allocate the water from ‘rainfall’ events to agriculture, household, industry or the environment, or any combination of these areas. The challenge is to keep water moving through the sculpture until the next bout of rain refills the reservoir.

The activities in the Envirodome are linked to things people can do in their own life to make a difference, as well as showcasing different design features of the building itself. Water conservation is emphasized in the toilets with urinals being waterless, toilets being designed to save water, as well as having screens that show water savings from using efficient facilities.

Since the Envirodome has only recently opened, effectiveness of these activities has not yet been assessed, but on-going evaluation will allow for changes to be made so that a visit results in more pro-conservation behaviours.

**Community-Based Social Marketing**

A formal technique that zoos can use to design their programs such that they increase the effectiveness of their conservation messages is Community-Based Social Marketing. Doug McKenzie-Mohr (2000) has combined psychological expertise with social marketing knowledge to develop the area of community-based social marketing. This approach is used to:

- strategically develop a target behaviour or activity to change
- identify possible barriers to behaviour change
- design a strategy based on psychological principles to overcome the barriers
- pilot the strategy with a small group of people
- finally evaluate the impact of the program once implemented across a community
This last step is vital, as without evaluation we can never measure the success or failure of any changes we try to bring about.

One example of zoos utilizing this methodology is in Melbourne Zoo’s ‘They’re Calling on You’ campaign aimed at mobile phone recycling (www.zoo.org.au/Calling_on_You). In this program coltan mining was identified as a threatening process for gorillas, which could be addressed by targeting mobile phone recycling which reduces the need for new coltan to be mined, as well as providing funds for primate conservation. Barriers were identified and postage paid satchels provided to visitors to overcome financial barriers, while also acting as a reminder when they returned home.

This particular program also utilizes one of zoos unique features; the ability to connect people with wildlife. The program was linked to an ambassador species within the zoo, the western lowland gorilla, and the connection people develop with the animals and their keepers, harnessed through a call to action made at keeper talks held at the gorilla exhibit. With only 4% of satchels taken from a static display returned, the 28% return rate from keeper talks shows the benefits of utilizing the unique features of zoos to increase pro-conservation actions. The “They’re Calling on You” campaign is now encouraging regional (and ultimately global) involvement, with all zoos in Australia being invited to get involved. Zoos must decide on one simple message to focus on or behaviour to change in any given campaign to ensure likelihood of success.

**Responsible interactions with wildlife**

Many zoos and aquaria harness their unique ability to connect people with wildlife by providing opportunities for visitors to engage in ‘close encounters’ with wildlife. This provides an intimate connection with wildlife, but do we really know the impact of the encounters? Do they change the participants’ knowledge, their attitudes towards conservation or facilitate behaviour change? Also how does the encounter impact on the behaviour and welfare of the animals involved in the encounter?

A recent evaluation of the ‘Cheetah Encounter’ at Monarto Zoo assessed the proximity of cheetahs to, and interaction with, visitors and found the encounter had no negative impacts on the cheetahs. For the human participants, there was improved knowledge about cheetah conservation issues and ways they could help as individuals. Sixty percent of participants also indicated they would undertake pro-conservation behaviours, although follow-up has not yet been done to determine actual rates of behaviour change.

In addition to close encounters with captive wildlife, zoos can promote responsible tourism in habitat countries. People are keen on ‘close encounters’ with wild animals, whether visiting mountain gorillas or swimming with whale sharks or orcas. Wildlife tourism can provide economic incentives to local communities to protect wildlife and their habitats, but must consider potential consequences to local communities should tourism decrease, such as during economic downturns (Litchfield 2008).
Zoos are well placed to educate people about responsible tourism behaviours, such as ensuring tourists do not consume ‘exotic’ meats (e.g. bushmeat), do not buy inappropriate souvenirs that may encourage illegal trade or poaching, and that they do follow guidelines, such as maintaining a ‘buffer distance’ that protects animals from potential disease transmission and behavioural disturbance.

**Lead by example...**

Zoos have a wonderful opportunity to be a showcase for the natural world, and to share the conservation message with the many people who visit zoos. Conservation psychology techniques can help zoos achieve their conservation mission, but the message will only be credible if coming from organisations that practice what they preach. Incorporating a science-based approach to evaluating the success of zoos endeavours is vital to ensuring we are undertaking best practice as well as maintaining credibility with the wider community.

By working together and making our passion for conservation contagious, the little changes we make, if well designed, can have big effects, resulting in the rapid change needed to stem the extinctions happening all around us (Gladwell 2000). Imagine a world where we’ve reached that tipping point.…

**Author Contact Details:**
Carla Litchfield | Carla.Litchfield@unisa.edu.au
Wendy Foster | wlfoster@zoossa.com.au

**REFERENCES**


Can responsible tourism help the survival of gorillas threatened by encroaching farmlands and the bushmeat trade? Here a tourist photographs a wild gorilla from a safe 9-metre buffer distance, at the edge of a national park and a tea plantation.
The processes threatening biodiversity across the globe are numerous and varied, yet the majority have one thing in common – humans. Zoos therefore have the potential to conserve wildlife by influencing the very people that walk through their gates each year.

Research suggests that generations XY and Z are fatigued from lofty 'you can do this at home' style messages. They like to do things now, not later, and expect the links to be tangible (Mindbranch 2008). This is great news for the 21st century zoo because contemporary theories emerging from the social sciences provide us with similar sets of advice for designing behaviour change campaigns. Zoos Victoria has trialled an education for sustainability model that has proven to successfully influence people to take action for conservation since 2005. The success of this model has extended conservation education beyond formal school learning experiences and into visitor based conservation campaigns.

Facing the facts – Zoos aren’t schools
In 2005 the education team at Werribee Open Range Zoo evaluated the effectiveness of their education programs. Teacher feedback was typically very positive, expressing high levels of student engagement and satisfaction. However what the zoo educators really wanted to know was are the students being influenced by their sessions? Did they go on to install a nest-box within their school after their Habitats Under Threat session? Did they go on to plant native grass species within their local area after participating in the Grassland Ecosystems class? And did any schools construct a frog-bog within their school grounds after learning about local endangered species?

The results from the post-visit teacher calls conducted at the end of the year were sobering. Although the programs were effective at raising awareness of environmental issues, they had not proven to be effective at influencing behaviours. The education teams desire to develop and deliver programs aligned with the aspirations of a 21st century zoo (WZACS 2005) motivated them to rethink, redevelop and readjust their education approach.

A range of education models were investigated, and the team looked beyond learning theories that simply rested within the formal education (and often school based) realm. The educators challenged their thinking and pedagogy by drawing upon approaches and tools trialled and utilised in industries such as health and marketing.

It did not take long before it had become evident that zoos were a unique and complex learning space that required an education model designed to cater for its own unique set of learning ambitions and objectives. The zoo education experience should be fun, experiential, student centred and motivating. It should inform students of current, relevant issues, and inspire them to take action. The experiences should be age appropriate, and should cater for a variety of learning styles. A well-designed zoo learning experience should offer opportunities for students to emotionally connect with wildlife and promote enquiry. What ready-made
The Connect-Understand–Act (C-U-A) model was used to develop and trial a number of zoo based education programs across the following two years. Evaluations at the end of the first year indicated that 88% of students participating in an endangered species program went on to take action for wildlife. Through facilitating onsite conservation action opportunities Healy (2006) highlighted that student interest, satisfaction and learning was higher than usual due to the tangible links to conservation.

In 2006 the model was trialled within rural Zimbabwe. The success of this program indicated that knowledge and skill acquisition as well as attitude and behaviour change could be achieved for student learning using the C-U-A model (Lowry 2007). Knowing now that the model can effectively connect children with wildlife, teach ecological understandings and inspire conservation action without geographical limitations, the question was then raised, was it limited to school children? The following year saw the C-U-A trials extend to cater for informal learning experiences encountered by the remaining 90% of our zoos visitors.

**Connect - Understand - Act**

- **A conservation education model**

Drawing upon contemporary learning theories and embedding behaviour change tools from behaviour change approaches such as community based social marketing (Mackenzie-Mohr 1999), the following conservation education model was designed to influence the development and delivery of education programs within Zoos Victoria.

Secondary school student erects nestbox within the school grounds.
Just as it is ineffective to simply tell a person to ‘love’ or ‘respect’ an animal, it is equally ineffective to ask a person to change their behaviour and expect them to do so (McKenzie-Mohr, 1999). However you can select appropriate tools that when designing an education experience, make it more likely to successfully connect, teach understandings or influence behaviours. Figure 2 below outlines a variety of ‘tools’ trialled across both formal and informal learning experiences at Zoos Victoria.

**Figure 2** A list of ‘tools’ that can be embedded within the C-U-A model to enhance the effectiveness of the conservation education program.

<table>
<thead>
<tr>
<th>CONNECT</th>
<th>UNDERSTAND</th>
<th>ACT</th>
<th>ESSENTIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tactile Experiences</td>
<td>Themed</td>
<td>Targeted behaviour</td>
<td>Multi-sensory</td>
</tr>
<tr>
<td>Close encounters</td>
<td>Games</td>
<td>Remove barriers</td>
<td>Comfort</td>
</tr>
<tr>
<td>Eye contact</td>
<td>Interactive</td>
<td>Incentive</td>
<td>Appropriate setting</td>
</tr>
<tr>
<td>Encourage observations</td>
<td>Layered/targeted</td>
<td>Eco-badging (appeal to image)</td>
<td>Fun</td>
</tr>
<tr>
<td>Storytelling</td>
<td>Thought provoking</td>
<td>Social norms</td>
<td>Themed</td>
</tr>
<tr>
<td>Characterising animals</td>
<td>Analogies</td>
<td>Likeness</td>
<td>Targeted behaviour</td>
</tr>
<tr>
<td>Role play/drama</td>
<td>Comparisons</td>
<td>Walk the talk</td>
<td>Layered/targets audience needs</td>
</tr>
<tr>
<td>Discovery</td>
<td>Visual aids (props)</td>
<td>Join others (link)</td>
<td></td>
</tr>
<tr>
<td>Unexpected/surprise</td>
<td>Relevant</td>
<td>Relevant</td>
<td></td>
</tr>
<tr>
<td>Mimicry</td>
<td>Appropriate questioning</td>
<td>Feedback</td>
<td></td>
</tr>
<tr>
<td>Privileged insights</td>
<td>Role-play</td>
<td>Tangible action</td>
<td></td>
</tr>
<tr>
<td>Reflective pauses</td>
<td>Storytelling</td>
<td>Access experts</td>
<td></td>
</tr>
<tr>
<td>Reinforcement (of skills, knowledge and behaviours)</td>
<td>Anecdotes</td>
<td>Commitments/Pledges</td>
<td></td>
</tr>
<tr>
<td>Encourage observations</td>
<td>Reflective pauses</td>
<td>Prompts</td>
<td></td>
</tr>
</tbody>
</table>

### They’re Calling on You – A case study

In 2008 Zoos Victoria developed an informal learning experience in the form of a visitor based conservation campaign titled ‘They’re Calling on You’.

The Connect – Understand – Act model guided the design of the visitor based conservation campaign.

1. **Select Threatening Process** – Coltan mining which currently takes place within the Democratic Republic of Congo (DRC). Coltan is used to coat the capacitors of electronic devices such as mobile phones and although the mining is illegal, it continues. The mining cuts pathways into primate habitat exposing them to poachers.

2. **Identify ambassador species** – The western lowland gorilla. Although coltan mining in the DRC does not directly impact western lowland gorillas (*Gorilla beringei graueri*), eastern lowland gorilla populations (*Gorilla gorilla gorilla*) have been significantly impacted.

3. **Identify target audience** – Mobile phone users (therefore people from the age of 12 and up).

4. **Select target behaviour** – Donate your old mobile phone to the They’re Calling on You program at Melbourne Zoo. This donation enable the Aussie Recycling Program (ARP) to make new phones from old phones which in turn raises much needed funds for primate conservation.

5. **Confirm enduring understanding** – Everyday actions such as purchasing or disposing of a mobile phone can impact wildlife both locally and globally.

6. **Identify connection opportunity** – Keeper talks were seen to provide the best opportunity to conduct story telling whilst weaving in the enduring understanding and delivering the facilitated call to action. Performance is also currently being trialled to ‘hook’ visitors to the key message.
They’re Calling on You — A case study

The ultimate aim of the ‘They’re Calling on You’ mobile phone recycling program is to:

- Divert mobile phones from landfill
- Lessen the demand for coltan mining by providing the coltan-coated capacitor in mobile phone with a second life (achieved by forwarding all mobile phones to Aussie Recycling Program for refurbishment).
- Raise money to support primate conservation through the sale of refurbished phones (funds are donated to Jane Goodall Institute Australia to support in situ conservation and Melbourne Zoo to support ex situ conservation)

The ‘They’re Calling on You’ mobile phone recycling program has provided Melbourne Zoo with the opportunity to impact primate conservation through their visitor actions. The success of the ‘They’re Calling on You’ program has confirmed that the C-U-A model can also yield positive results when utilised to design informal experiences for general zoovisitors.

Since the program began in October 2008, the following milestones have been reached:
- more than 8000 phones have been donated (approximately 1000 phones per month)
- more than AUS15,000 dollars has been raised to support primate conservation
- 57 large corporations have registered to the program, committing their retired mobile fleets
- media communications have raised the profile of the program and Melbourne Zoo.
- 60 schools have signed up to conduct mobile phone drives

Barcodes have been placed on the satchels to enable us to track points of influence. 28% of mobile phone recycling satchels handed out at keeper talks have been returned to date. Satchels taken from dispensers at the front and back exits of the zoo have had a 4% return rate (an industry standard). The Melbourne Zoo website has also been utilised to facilitate the call to action, allowing people to download postage free labels to send phones from home at no cost. Thousands of people have visited the campaign website and the success of the three month trial period at Melbourne Zoo has motivated ARAZPA to adopt the program as a regional campaign throughout Year of the Gorilla.

Conclusion

Zoos are unique learning environments that require a tailored approach to conservation education to suit the context and purpose of the 21st century zoo. The Information Intensive model has proven to be ineffective at inspiring conservation action. Since 2005 Zoos Victoria has trialled an education model that combines contemporary learning theories with behaviour change tools recommended by social scientist such as Mackenzie-Mohr (1999).

As zoos begin to design conservation education programs that cater for generations XY and Z they will need to keep the messages short, sharp and engaging and wherever possible fun to experience. Selecting threatening process that are relevant, and easy for people to contribute to will be essential, and placing more emphasis on facilitating actions rather than delivering information will be critical. Once zoos can demonstrate their potential to contribute to wildlife conservation through visitor based conservation campaigns, our relevance within the 21st century will be solidified and we will have a new set of reasons to drive visitation to our zoos.

Author Contact Details: Rachel Lowry | rlowry@zoo.org.au

References


Education for Conservation of the Paraná Pine Ecosystem in Misiones, Argentina

by Soledad Magallanes

The Paraná pine forest ecosystem is located in Misiones, containing a large number of species that are only distributed in this part of Argentina. Nowadays, this ecosystem is only represented in two Provincial Reserves. The Temaikèn Foundation is committed with biodiversity preservation through the expansion and management of natural reserves, in which research and education play a key role.

Fifty years ago over 210,000 hectares in Misiones was covered with Paraná pine. Nowadays, this area is reduced to around 2,000 fragmented hectares, 524 are protected as part of the ‘Araucaria Provincial Park’ (92 hectares) and ‘Cruce Caballero Provincial Park’ (432 hectares), both natural reserves. Human beings have been related to this ecosystem for hundreds of years and numerous ethnic groups have developed their culture here, obtaining food and protection resources from this rainforest. The challenge of the Paraná Pine Conservation Program is to preserve and expand these isolated areas and to manage attitudinal change in the people who are immersed in this habitat.

Threats
The timber industry has caused a reduction of many tree species, the best seedbeds are disappearing and disrupting the composition of the forest. Two important threatened species found in this ecosystem are the Paraná pine (Araucaria angustifolia) and vinaceous breasted parrot (Amazona vinacea). In San Pedro, as in a considerable part of the Paraná pine forest, conservation problems come from social issues. Land is used mostly by timber and tobacco industries, where local people look for short term profits just to satisfy their needs. This results in soil degradation and deforestation of additional forest areas.

Goals
The general objectives of the program are to contribute to the conservation of the Paraná pine ecosystem, especially the populations of Paraná pine and vinaceous breasted parrot and to make people aware of conservation problems.
To achieve these goals Temaikèn Foundation is working on four main aspects:

1. To protect areas of the Paraná pine forest those are currently intact.
Since November of 2007 the program is participating in the co-management of the last and most important Araucarias' forest areas; Cruce Caballero and Araucaria provincial parks. This is the first time in Argentina that a co-operation agreement between Misiones provincial government and a foundation has been signed. Park rangers from both areas work in partnership in both research and education activities in this program.

2. To reconstruct the degraded ecosystem.
In order to develop new sowing areas, performance tests have been run since 2005 to assess the performance of different kinds of substrate for the seeds of Araucaria angustifolia, all taken from provincial parks. Tests consisted of changing the light intensity and the substratum, to evaluate the power of germination and the viability of the seeds. Two hundred seeds of Paraná pine from Cruce Caballero were sowed, as part of the program of the Educational Training Course.

3. To ensure plant and animal reproduction
Since 2006, 731 seeds of Araucaria angustifolia from Misiones were seeded in Temaikèn and 80 Paraná pine saplings were planted in Misiones. The remaining trees will be planted in the ecosystem over the coming years.
In 2006, nine vinaceous breasted parrots that were pets in San Pedro were saved by rangers and taken to Temaikèn as part of a behavioral study. Up to now, two reproductive couples have successfully raised three chicks.

4. To make people aware of the importance of preserving the ecosystem.
The Temaikèn Foundation develops and gives advanced training courses for teachers and rangers. These courses are supported by the government and have been declared a Municipal Interest by the Sport, Tourism and Culture Direction of the Municipality of San Pedro and a Provincial Interest by the House of Representatives of the Province of Misiones.
The aim of the advanced teacher training course called ‘An Approach to the Paraná Pine Ecosystem’ is to facilitate a deeper understanding of the Paraná pine forest, thereby promoting the appreciation of the flora and the fauna of this particular ecosystem, through increased knowledge about representative species such as the Paraná pine and the vinaceous breasted parrot. Sharing knowledge with course participants about the characteristics of the components that integrate this ecosystem, the critic situation, and the importance to act quickly is paramount. Revaluing the special atmosphere that surrounds them and to find in it an educative tool, allows them also to implement interdisciplinary activities and topics. Topics include the general characteristics of plants, with an emphasis on the Paraná pine; general characteristics of birds, mainly of the vinaceous breasted parrot; and considering all the aspects related to the conservation of the ecosystem, including the social issues.

During the second stage we visited the schools of the teachers who participated in the course, sharing diverse playful-educational activities with their students. Didactic material is given to the schools and Paraná pine seedlings produced in Temaikèn nursery are planted with all the school community. In only three years we visited 80% of San Pedro’s schools. With the pupils we have planted 180 Paraná pine saplings at the schools. We have reached 86 teachers and 3160 students from 37 schools. 48.8% from them are rural schools.

Since 2005, the Temaikèn Foundation has taken part in the 2nd Celebration of the Araucaria Ecosystem, in San Pedro (Misiones), offering different activities for schools and families in order to encourage appreciation of the ecosystem, with the intention of making people aware about the urgency to take actions.

Since 2005, we have developed and ran courses for rangers. During the First Meeting for Rangers on ‘coordination of the recreational activities in Protective Areas’, we worked together with 76 rangers and advanced level students pursuing this as a career. Now, the Temaikèn Foundation is designing different plans that involve the sustainable use of resources in order to improve the relationship between the community and the environment. We consider that this the key to preserving this ecosystem. Carrying out these kind of tasks together with the community, being sensitive to and respectful of its culture and social reality, allows us to believe in a positive change of the way that we are connected with the environment.

Author Contact Details:
Soledad Magallanes | smagallanes@temaiken.com.ar
Engaging the interest of zoo visitors as a key to biological education

Conservation education is a key role of zoos, but it is too specialized for visitors who rarely attend zoos with learning as their main objective (Patrick et al. 2007). To hold the visitor's attention and to encourage learning, it is crucial to engage and develop their interest. Therefore, we examined which specific features in zoos support the development of interest for different categories of learners.

Participant observation (Frankfurt Zoo, Scheersoi): What makes visitors stop? What do they talk about?
Theoretical framework

Conservation of endangered species and their habitats is a key role of zoos. Part of realizing this aim is to inform and involve the public in understanding this mission. Zoos are in a unique position to provide environmental and conservation education to large numbers of people (Patrick et al. 2007). However, this educational task is difficult. Visitors have a limited knowledge of the complex field of conservation biology (e.g. Swanagan 2000) and educators need to introduce them step by step to the issues to overcome their knowledge and understanding deficit (Fig. 1).

Figure 1 Conservation triangle: Knowledge and understanding deficit for zoo visitors.

Such efforts are more effective if the visitors’ interests are engaged and developed. Interest is crucial in holding attention and encouraging learning, especially in zoos, where visitors rarely attend with learning as their main objective. An interest-based action has the quality of intrinsic motivation and provides a positive emotional experience. Therefore, we wanted to find out which specific features in zoos support the development of interest for different categories of learners: What makes visitors stop? What do they talk about? As theoretical framework, we used the Person-Object-Theory of Interest (POI) (Krapp 1999; Schiefele 1991) which refers to interest as a psychological construct that includes attention, persistence in a task and continued curiosity. According to this theory, an interest represents a specific relationship between a person and an object (Fig. 2).

Figure 2 Person-Object-Theory of Interest (POI, Krapp/Schiefele), main constituent parts.

There are different types of interest which reflect differing amounts of knowledge, feelings, and value. The realization of an interest requires a situation-specific interaction between the person and the object. An object of interest can refer to concrete things, a topic, a subject-matter, or even an abstract idea. If the experiences during the interaction between the person and the object are positive interest is likely to emerge in response to situational cues (= situational interest). If situational interest endures it can become a deep interest that resides with the individual over time (= individual interest). Individual interest holds special value to the person and he/she will invest time and effort pursuing it. Educators can have an enormous impact on the development of interest by influencing the quality of interaction between the person and the object.

Materials and methods

This paper considers data from work in different zoos. The behaviour of visitors of all age groups was observed (participant observation) and their spontaneous conversations were recorded and analyzed.

Each conversation at a particular animal exhibit was counted as one conversational unit. For the data analysis, a systemic network with 74 categories was used to group the comments. This network, being a parsimonious representation of the data, whilst preserving the relationships between categories in such a way that comparisons could be made between groups, had been worked out from pilot studies (Tunnicliffe 1995, 2005). During the analysis, special attention was paid to the visitor’s interpretation of the phenomenon presented, as well as to affective comments and reactions and value attributions, being indicators for emerging situational interest (amount of knowledge, feelings, value; see above).

Results and discussion

The data indicate that visitors look for an animal, name it, describe salient features and behaviours, make affective comments (such as “I like that” or “Ugh”), and interpret in anthropomorphic terms. Visitors rarely read the information provided by the zoo (texts) and interpret at the level of their existing biological knowledge, which is generally basic. They are especially attracted by young animals, big and dangerous animals and action in an enclosure – such as fighting, mating or feeding – and by phenomenon which connect with their personal experiences. These include every day observations of animals around (pets, farm animals, local wild animals), media
representations and narratives. A lot of conversations also deal with human/animal interactions e.g. the concern about what the animal could do to them (“Is it poisonous?”) or what the visitor would like to do to the animal (“I’d like it as a pet”).

In almost two thirds of all conversations, visitors commented about aspects of the exhibit other than the animal, e.g. on objects such as rocks or other ‘exhibit furniture’.

The features identified through the data analysis (concerning animals as well as exhibits), are the portals to the visitors’ situational interests. They are capable of holding the visitors’ attention and evoking emotional responses.

**Conclusion**

We conclude that the educational role of a zoo can be met by developing their initiatives in respect to the visitors’ knowledge and building them on anchor points common to the majority of visitors.

Furthermore, visitors should be enabled to relate their previous experiences to the phenomenon presented. Adopting such an approach offers visitors opportunities to develop situational interests. This interest is likely to render them open to accommodate new knowledge and ultimately acquire an understanding of conservation.

**Author Contact Details:** Sue Dale Tunnicliffe | s.tunnicliffe@ioe.ac.uk

**REFERENCES**


Building Constituencies for Big Cat Conservation:
Education and Evaluation in Jaguar and Tiger Range States

by Nalini Mohan | INTERNATIONAL TEACHER TRAINER | WILDLIFE CONSERVATION SOCIETY and Tom Naiman | WILDLIFE CONSERVATION SOCIETY | US PARTNERSHIP FOR EDUCATION FOR SUSTAINABLE DEVELOPMENT | USA

The Bronx Zoo’s Education Department conducts educator training workshops around the world. Jaguars Forever and Teachers for Tigers are two programs designed to provide educators in jaguar and tiger range states with effective, low-cost materials for use with a wide range of audiences. This article describes our in-situ education program and evaluation efforts.

Jaguar (Panthera onca).
Juan Carlos paused, and listeners laughed. It was a moment of comic relief in a serious and heartfelt story. Some of the participants in our Jaguars Forever workshop had experienced their own jaguar encounters, and the details shared by Juan Carlos enabled those who had not had such an encounter to imagine what it would feel like to be alone in the forest with a powerful predator.

As educators at the Bronx Zoo, a unit of the Wildlife Conservation Society (WCS), which works to save jaguars throughout their wide range in Central and South America, it is important for us to listen to people who live in communities like Jameikärí, because their attitudes and behavior will help determine whether the largest of the American cats has a chance to survive. The workshop in which Juan Carlos told his story included 38 educators from villages, schools, and protected areas throughout Costa Rica. It was based on materials and methods designed by the Bronx Zoo’s Education Department for its Jaguars Forever manual, a low-tech educator’s toolkit to teach people in jaguar range states about the biology and important ecological role of jaguars, their significance in Latin American cultures, how scientists study them, why they are in jeopardy, and what it will take to save them.

Despite the seriousness of these subjects, the workshop was fun and exciting. To encourage empathy with jaguars and communicate important themes in a non-threatening way, participants performed short dramas explaining jaguar courtship, hunting and parental care, as well as the dangers of poaching. They used masks from the manual and natural materials to create props and costumes, and became animated and enthusiastic performers of their dramatic roles.
In-Situ Conservation Education

In collaboration with its Latin America and Caribbean Program, the Bronx Zoo’s Education Department has been conducting jaguar-based education workshops in Central America since 2006. But many of the materials and activities that are its centerpieces were developed in conjunction with an earlier Bronx Zoo education and outreach program, *Teachers for Tigers: An Educator’s Tool Kit for Saving the World’s Greatest Cat*. *Teachers for Tigers* was developed in the late 1990s and early 2000s in response to requests from WCS scientists working in Asia, who cited the need for materials and activities that could improve attitudes and build knowledge and support for tiger conservation among a variety of audiences in tiger range states.

In 2003, WCS partnered with Sally Walker and her Zoo Outreach Organisation (ZOO), based in India, to conduct the first of 18 collaborative workshops in South Asia. ZOO maintains an outstanding network of educators and scientists based largely at zoos and protected areas throughout India and other South Asian countries, as well as an excellent education staff of its own. Largely as a result of this model collaboration between the Bronx Zoo and ZOO, *Teachers for Tigers* has now been translated and into 12 Asian languages and has been implemented in eight of the 13 countries where tigers still survive in the wild: Bangladesh, Bhutan, China, India, Laos, Malaysia, Myanmar and Nepal. *Teachers for Tigers* has been used to train staff from almost all of the Project Tiger Reserves in India, to equip park rangers from throughout Peninsular Malaysia, and to motivate schoolteachers and their students in northeast China. Perhaps most indicative of the program’s impact is that ZOO and workshop participants have continued to conduct these workshops on their own, as well as using the methods as a model for new programs. In 2007, ZOO used many of the methods and materials as the basis for *Helping Hoolock Gibbons Hang On* and has also repurposed elements in new materials dedicated to bear conservation, human/elephant coexistence, and the amphibian crisis.

Evaluating the Impact

The translations and widespread use of *Teachers for Tigers*, along with surveys we have done with participants at the close of the workshops and several months later, testify to its effectiveness as an educational tool. However, despite this success, we have not been able to document if this impact on workshop participants leads to more widespread impact among the members of the communities where they work and, more impor-
tantly, whether it leads to meaningful support for conservation.

In recent years, education and outreach increasingly have played a role in conservation efforts and many conservation biologists feel they are critical tools in terms of developing local support for conservation efforts. Yet, as more resources are allocated to conservation education, there is a real need for studies that assess and document the impact of programs like Teachers for Tigers.

Thus, when WCS received funding for jaguar conservation from the U.S. Department of State, we saw an opportunity for more ambitious evaluation efforts. Working with Dr. John Fraser and Jessica Sickler of WCS’s Public Research and Evaluation program, we designed a series of tools to examine attitudes, behaviors and knowledge among our participants and within their communities. We started in Guatemala, where we conducted two Jaguars Forever workshops, including one for educators from Petén, close to the Maya Biosphere Reserve, home to Central America’s largest tropical rainforest. As part of our evaluation plan, workshop participants completed a variety of surveys, answered written journal questions, and were interviewed by program staff. Participants also were asked to write a letter to a jaguar describing how their community values or dislikes jaguars and why.

A key part of our evaluation also involved visiting villages where WCS is engaged in community-based conservation. In Paso Caballos, located in the Maya Biosphere Reserve, about 200 children and many adults gathered in the dirt-floor community center. After a warm-up activity using animal sounds and movements, three large groups were formed to perform short, wordless dramas from the Jaguars Forever manual. The children had great fun performing and afterwards they received a jaguar button, snacks and temporary jaguar tattoos. In addition to promoting enthusiasm about jaguars, the event had another serious purpose, bringing community members together so that they could be interviewed as part of our assessment of their knowledge and attitudes. This baseline information was compared to information gathered after the Jaguars Forever program was implemented in their communities.

When we returned to Uaxactún, just north of Tikal National Park, about six months after implementation, the forty students ages twelve to sixteen had covered almost the entire Jaguars forever manual. With the help of a jaguar costume and with the Uaxactún archeological site as a stage, they performed a jaguar drama they had written. Sixty interviews focusing on the implementation and impact of Jaguars Forever and
attitudes towards jaguars and nature were conducted with teachers, students, and adult community members.

Our evaluation is telling us a number of interesting things that will be useful to future work. The majority of our workshop participants confirmed that the students in their communities have minimal knowledge of jaguars; about half told us their students are afraid of them. We have found that participants from rural areas and small towns seem to have more compassion for animals and humans than those participants living in cities.

Our results also have shown that participants value jaguars most for their cultural importance and for their natural beauty. In future workshops, we will seek to address this lack of knowledge in rural communities of the important ecological role of jaguars and to use educational approaches that emphasize the cultural value many of our participants expressed.

**An Urgent Need for Conservation Education**

There are 36 species of wild cats in the world, and the majority of them are endangered. Beyond their role in healthy ecosystems, there is much we humans will lose if these cats disappear. There are few groups of animals that have been more intertwined with our lives and our belief systems through the ages. In the US, we need only look to our sports stadiums where we see Bengals in Cincinnati, Jaguars in Jacksonville, and Tigers in Detroit, to name just a few, or peruse the stacks at our closest children’s library to see the hijinks of Tigger or the ambitions of the Dr. Seuss character who boasts, “I can Lick 30 Tigers Today.”

Like wild cats and the conservation issues that follow them, these cultural roles and values transcend international boundaries. Juan Carlos, from the workshop in Costa Rica, told us, “We are always visited by jaguars, and have been for hundreds of years. They’re part of us. Cabecar culture. We have the mythical Dinamá, the two-tailed jaguar of water, who protects us and drowns those who misbehave, leaving a big hole in their heads. Jaguars are special and beautiful. As artists, we always use the jaguar as inspiration.”

Shortly after the close of a Teachers for Tigers workshop we conducted for protected area staff in the Himalayan kingdom of Bhutan, we visited one of that nation’s most important cultural and religious sites, the Tiger’s Nest Monastery. Led by Sonam Choden, a colleague from the Nature Conservation Division of the Royal Government of Bhutan, we hiked for hours through thin air and under a beating sun to reach this amazing series of seven small temples, which clings to a sheer cliff face more than 10,000 feet above sea level. First constructed in the 17th Century, it was here, in the 8th Century AD that the Guru Rinpoche is said to have touched down, riding on the back of a tigress, when he brought Buddhism to Bhutan. There are still wild tigers not far from the Tiger’s Nest Monastery. But standing there, it was easy to see the precarious nature of the buildings as a metaphor for the precarious status of tigers throughout their shrinking natural habitats, and of what we all stand to lose should they disappear. We hope that some day when the survival of tigers and jaguars is secure, we and other conservationists will be able to look back on our work with a sense of the achievement that we felt that day, after a long and tiring climb, looking down from The Tiger’s Nest to the valley floor.

**Author Contact Details:** Nalini Mohan | nmohan@wcs.org

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All photos © Wildlife Conservation Society

1 Former IZE Board Member Tom Naiman has recently left WCS/Bronx’s Zoo to take up position with the New York City’s Department of Education.
Generation Z to the rescue!
Children saving endangered species – one community at a time

by Rochelle Bishop (Education Officer) and Nikki Bodel (Education Officer) Taronga Conservation Society | Australia

The Taronga Conservation Society Australia (TCSA) Education Team has developed a highly successful formula for engaging young people in finding their role in conservation, connecting them with their peers, their family, their community and ultimately – empowering them to help save endangered wildlife. This paper details the evolution of a community education program, outlines our successes, explains why the program is so successful and lists future plans for its continual improvement.

Taronga Conservation Society Australia (TCSA) currently supports a variety of species recovery programs for threatened species. Each program has a core focus of research, breeding, rehabilitation, release and education. Our education team was keen to investigate the current education methods that had been implemented for each threatened species. Pamphlets, signage and community information sessions were common tools used for educating the local community about the species. However, the Taronga Education team challenged how effective these methods were in ‘getting the message out there’. These ‘traditional education methods’ seemed quite passive rather than engaging the community and developing a sense of ownership for each local species.

Our education team believed that the success of these programs would be enhanced if an action plan for community education was incorporated, utilizing a very valuable resource which had not been tapped into – school children!

In 2007 the TCSA Education team developed ‘SOS Education’. The Save our Species Education Program is an in situ conservation education program that engages school aged students to become advocates for a locally endangered species, influencing members of their own community to take action for the animal’s conservation.
‘SOS Education’ exceeds all expectations of recovery plans and has to date proven highly successful in engaging school children to find an active role in the community and in conservation. The program design is unique in that it appeals so strongly to the attributes of generation Y and Z – connecting them with their peers, their family, their community and ultimately – empowering them to help save endangered wildlife.

**The Inception of ‘SOS Education’**

The TCSA Education team, after having completed an evaluation project in 2006 based on the effectiveness of their teaching practices, were keen to address the ‘quality versus quantity’ issue – a familiar problem for many large zoos and aquariums. ‘SOS Education’ was designed from a desire to support the TCSA’s contribution to Species Recovery Plans and in doing so, align the TCSA with schools and their local communities.

**‘SOS Education’ goals include:**
- To inspire students to engage and influence their community in raising awareness and facilitating behaviour change to help save a locally endangered species.
- To demonstrate ‘best practice’ in Project Based Learning, Quality Teaching and Student Voice.
- To encourage school students to join or create a volunteer Coastcare or Landcare group following the project.

**The evolution of ‘SOS Education’**

During 2007 the Taronga Education team challenged themselves to designing an ‘SOS Education’ project for one of the key species supported by the TCSA – the little penguin.

The little penguin (*Eudyptula minor*) is relatively common in waters of Southern Australia, breeding mainly on offshore islands. The colony in North Sydney Harbour represents a small fraction of the New South Wales (NSW) population, but is the only known breeding colony on the mainland in NSW. It is unique and endangered (NPWS 2000).

Taronga Zoo has strongly supported the Recovery Plan for this colony in the form of: rescue, rehabilitation, breeding and release. A long term goal for the recovery team had always been to implement an education program for the local Manly community. Manly residents live right amongst the endangered population of little penguins, thus community awareness with facilitated behaviour change is an essential aspect.

Due to the huge success of ‘Project Penguin 07’, we were approached by several other schools who were keen to participate, including high schools. In 2008, ‘Project Penguin’ targeted four local primary schools and two local high schools – a total of 550 students all working towards raising community awareness for the little penguins of Manly.

With a successful education program underway and a three year sponsorship arrangement to support it, the TCSA Education team was ready to challenge ourselves to target another threatened species – the Booroolong frog (*Litoria booroolongensis*).

**The Booroolong frog** (*Litoria booroolongensis*).

The Booroolong frog is restricted to NSW and north-eastern Victoria, predominantly along the western-flowing streams of the Great Dividing Range. It has disappeared from the Northern Tablelands and is now rare throughout most of the remainder of its range.
Most recent records are from the south-west slopes of NSW (Department of Environment and Climate Change - DECC 2008). The TCSA supports the recovery of this species by working collaboratively with the Department of Environment and Climate Change to breed, release, track and monitor the species as part of a recovery plan.

As the majority of remaining species are dwelling on private land, educating the local community is a vital component of this species survival.

An education program was designed to target the school students and residents of Tumbarumba (situated at the base of the Snowy Mountains) – creating awareness of the plight this frog species and how the local residents could aid in its survival. Perhaps due to this local community being in a rural setting, the students, parents, teachers, farmers and other community members all responded positively.

**The students’ learning journey**

Students embark on an eight to ten week learning journey where they discover first hand from local experts, about the plight of the threatened species and how they can help. They hear from experts in the field who are involved in the Recovery Plan, are trained in skills such as bush regeneration, fauna surveys and water testing. The students are then challenged in a competition, to produce a community awareness campaign for the threatened species. Entries are showcased at an ‘expo’ day held at Taronga Zoo. The campaigns / projects are also displayed at several community environmental events, local shop windows, local libraries and shopping centres.

“The students learning journey was centred around the students becoming the producers of knowledge as opposed to consumers of knowledge, as they were not only expected to research information produced by others but they were involved in field work, where they produced knowledge through observation and deductive reasoning”.

(L. Black, principal, Manly Village Public School)

The program is designed as a multidisciplinary approach to integrating key learning areas into a comprehensive educational model with a strong focus on practical learning – a ‘hands on’ approach. The program design utilises the latest ‘best practice’ teaching innovations such as ‘Project Based Learning’, ‘Student Voice’ and the ‘Quality Teaching’ framework.

**Mentoring – kids teaching kids**

During 2008 we trialled an additional element to the program – ‘kids teaching kids’. This new approach included high school students as mentors to the primary students, a ‘peer tutoring’ approach. The activities were redesigned to engage both levels of learners. Students kept reflective journals throughout the project which mapped their learning process.

Not only did this approach prove to enhance the learning and the quality of the end product but also build relationships between students, teachers and other schools.

Peer tutoring is an effective way of addressing ‘middle years’ (years 5-8) issues that some students experience in this age, as they risk disengaging from learning. This model of ‘peer tutoring’ has now been integrated into our ‘SOS Education’ program design.

**Proven Success**

Evaluation was purposely written into the design of all ‘SOS Education’ projects so that not only could participants reflect and review their own learning, but so that we could have a tool for continuous improvement.

The following is a selection of anecdotes from students, teachers and Zoo staff that highlight program-successes.

**Us kids are in the best position to influence our friends, teachers and parents. We will be the decision makers of the future.**

(C. Astill student – now volunteering for DECC)

I thought it was fabulous. The class really enjoyed learning and it was very practical learning, not just from books and the internet!

(L. Meade – teacher)
Thank you again for all you've done to help our community and the Booroolong frog. It's a great partnership and I hope we work together again soon.
(J Cullen - CMA Tumbarumba Office)

The Quality Teaching framework allowed our children to learn so much. Engagement, High Expectations and Deep Knowledge were high on the list.
(Principal – J Organ)

It is amazing what can be achieved when groups of schools and the community work together in close partnership to explore authentic issues. Students’ level of engagement is more profound when learning activities have real world significance.
(DG Education – Michael Coutts Trotter)

Future scope and potential
Although ‘SOS Education’ is still in its infancy, it is evident that the success of these pilot projects are achieving extensive community awareness and addressing key educational outcomes.

Our future directions for ‘SOS Education’ include:
- Seeking sponsorship funding to expand the project to other schools within greater NSW and target other threatened species such as the regent honey eater, long nosed bandicoot, and brush tailed rock wallaby.
- Integrating an indigenous perspective into all programs.
- Using new technologies such as video conferencing to enhance learning and target schools in greater NSW and western regions and to add a global perspective.
- Implementing programs and a formula that could cross over between state to state – a ‘national’ program.
- Encouraging the students families to ‘take action’ as a follow up to the program – through the guidance of information evenings and community volunteer groups.
- Landcare funding as an overarching sponsor for ‘SOS Education’.
- Focus on targeting facilitated behaviour change, eg. join or establish a Landcare / Coastcare group or any community volunteer program directly related to saving endangered species.
- Establish regional YATZ groups for sustainability of individual programs.

Conclusion
‘SOS Education’ has proven to be a success in engaging young people to raise community awareness of locally threatened species. Part of this success can be attributed to the ongoing professional learning and commitment of the TCSA Education Team to keep current with the needs of our target audience (students, teachers, community and the animals)!

Understanding young people is crucial to facilitate their engagement. Zoos and aquariums are in a unique position to provide the authentic, relevant, engaging experiences that our school aged children need. This kind of learning is so important in a time where Quality Teaching and Project Based Learning are not common practice in all schools. Teachers are continually surprised by the learning potential and engagement they witness from their students during this program.

“I was surprised by the end product – the students’ projects amazed me and the knowledge that every student had by the end of the project was fantastic”
(J. Organ, Principal)

We endeavor to model this style of teaching and engagement to classroom teachers in the hope that teachers also see the effectiveness of addressing their students’ needs.
Author Contact Details: Rochelle Bishop | rbishop@zoo.nsw.gov.au; Nikki Bodel | nbodel@zoo.nsw.gov.au

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http://www.parenting-forum.org.uk/publications/empowering_parents_text.htm
http://en.wikipedia.org/wiki/Project-based_learning

Project based learning (PBL)
This style of learning provides complex tasks based on challenging questions or problems that involve the students’ problem solving, decision making, investigative skills and reflection that include teacher facilitation but not direction. They take a problem and apply it to a real life situation (Wikipedia 2009).

Students respond so well to PBL because the projects are ‘realistic, not school-like’. This gives the students the feeling of authenticity that they prefer with their learning (Thomas 2000). It also caters for all abilities, talents and learning styles of the students.

The Director General NSW Department of Education describes PBL as ‘best practice’ and noted after observing our program that the ‘level of engagement is more profound when the learning activities have real world significance’.

Family Learning
Haggart (2000) describes family learning as: ‘what people outside the family do to enable and facilitate the learning that goes on in families’.

Buffton (1999) defines family learning as that which: ‘supports efforts to raise children’s achievement levels, raises expectations and aspirations of both children and adults, promotes active citizenship and, as the family group is the microcosm of the community, is community capacity building at its best’.

Student Voice
Student Voice is a practice largely overlooked by teachers when they are creating new programs or collecting evaluations for program improvement. It is based on the knowledge that ‘students know what they need for their learning, they just need a framework to articulate it’ (Groundwater-Smith 2006).

Quality Teaching
The Australian Government Quality Teaching model is essentially a model of teaching based on how pedagogy can improve students’ learning outcomes (Gore and Ladwig 2003).

The model describes three dimensions and 27 elements within. It is advised to choose a cluster of elements from the dimensions to focus on, rather than attempt to fit all into one lesson (J. Gore, pers. comm., 2007). In fact, it could indeed be detrimental to be emphasizing a particular element when the lesson is best suited to others.

It ‘assumes that teachers who adopt the pedagogy will achieve better student outcomes’ (Gore and Ladwig 2003).
We build nature.
Themed Construction • Exhibit Design
Artificial Rocks & Trees • Master Planning
Aquatic Exhibits • Public Aquaria • Models
Landscape Design • Renovation Projects.
At Disney’s Animal Kingdom, inspiring guests to take conservation action is part of our mission.

To that end, a series of child-focused activity stations were developed called the ‘Kids’ Discovery Clubs (KDC). Our goal with these stations is to provide opportunities for children (target ages 5-8 years old) to learn about animals and what they can do to help wildlife. The purpose of this study was to assess the efficacy of the KDCs in encouraging young children to learn about and to help wildlife.
Today children in the United States are spending less time in nature than ever before. With tremendous competition from television, the Web and video games, children appear to prefer to stay inside rather than venture outside where nature is less showy and slower-paced (Louv 2006). Yet, as conservation educators, we hope to positively influence our guests’ knowledge, attitudes and behaviors about wildlife and wild places, even when those guests are only 5-8 years old.

When assessing learning in children 5-8 years old, knowledge may be in the form of recall and comprehension of information. According to Bloom’s Taxonomy of Educational Objectives, there are six levels of cognitive thinking. The first and simplest level is knowledge. Knowledge, in this case, is described as recall of data. The second level is comprehension. This level includes the ability to translate information by describing it in one’s own words (Bloom 1956). Therefore, when assessing learning in children 5-8 years old, increases in knowledge can be measured by the ability to both recall and comprehend information. In Piaget’s developmental theory, children in the target age range are in transition from centration (focusing on one dimension of an object) to concrete operations where logical assumptions can be formed (Fitch 1995) which suggests that studying learning in this age range requires a process that allows for both centration and derived logic.

This study measures young children’s learning in a fast-paced, free-choice, theme-park setting at education sites called the Kids’ Discovery Clubs (KDC). The KDCs at Disney’s Animal Kingdom are comprised of six, child-focused, exploration sites that provide activities for young guests aged 5-8 years and their families. Each site engages children with an activity that is wildlife focused and shares a conservation action geared to younger audiences.

| Asia: Children visit a listening station to identify the calls of siamangs that live in the Asian rainforest. The children push three buttons to hear the calls of three Asian forest animals, a frog, a tiger and a siamang. Through a process of elimination, they identify the siamang call and learn siamangs depend on the forest for survival. Educators suggest purchasing recycled homework paper to help protect forests. |
| Conservation Station: Children search for wildlife in ‘our’ backyard using a wildlife card and crayon to record their findings. They discover that many of these same animals live in their own backyard. Educators provide ideas on how to create backyard habitats, like hanging a bird house, for animals at home. |
| Camp Minnie-Mickey: A ‘touch’ log allows young guests to discover objects found in an Adirondack forest. Children reach into the ‘knot holes’ of a fabricated tree to identify four objects (bird nest, turtle shell, deer antler and pinecone) without any visual contact. Each of the objects is displayed on the top of the log to assist younger guests with their guesses. Educators suggest that children tell friends and family how important forests are to wildlife. |
| DinoLand USA: Children excavate assorted fossil puzzle pieces from a ‘fossil-crate’, similar to the job of real paleontologists. Children match puzzle pieces of dinosaur skulls and jaws. By examining the teeth on the puzzle pieces, young guests discover what dinosaurs ate millions of years ago. Educators intimate that children can help protect the animals that are alive today by recycling newspapers, cans and glass. |
| Africa: Children examine clues left behind by an animal (footprints and droppings) and make an ‘educated’ guess (through pictures) as to which animal it was. They check their answer by looking through binoculars ‘aimed’ at the correct animal. Educators encourage children to look for wildlife clues at home to learn about the animals in their area. |
| Discovery Island: Children have a close-up experience with the real, live animal-stars of the Bug Show. A tree-root ‘stage’ provides three flat surfaces for live animal containers with a variety (tarantula, cockroaches, lubber grasshopper, etc). Another element allows kids to ‘see like a bug’ by looking through a bug mask viewer. Educators suggest reading books on bugs to learn about all their cool features. |

Table 1 Description of the Kids’ Discovery Clubs (listed by location in the park)

Typically, the interactions at each of these KDCs last about three minutes, although some are significantly longer. Each station is staffed by specially trained interns who have learned special specific skills to work effectively with young children and deliver age-appropriate, action-based conservation messages. Each message is meant to promote caring attitudes towards wildlife in young guests.

The purpose of this study was to assess the efficacy of the Kids’ Discovery Clubs (KDC) in encouraging young children to learn about and to help wildlife. Specifically,
we wanted to know if brief, engaging experiences affect a child’s animal knowledge and interest in adopting conservation behaviors. A primary challenge to making these assessments was to develop methodologies that were not only reliable and valid, but also fun and engaging for our subjects. Our research questions were:

- What knowledge and messages do children take way from a KDC experience?
- How interested are children in initiating a conservation activity after participating in a KDC activity?
- What barriers do parents encounter in assisting children with conservation activities?

**Methodology**

The assessment was conducted in Disney’s Animal Kingdom Theme Park (near Orlando, Florida USA) with children ages 5-8 years old and their parents. A fun, activity-based approach was used to ensure that the assessment process was a seamless extension of the actual KDC experience and that the young children in our target age group could participate with very little assistance from their parents. The sample size of our study group included 552 interviews of children and their parents.

Testing involved asking children to point to photographs that symbolized what they had just learned such as ‘At the Kids’ Club, what clue did you use to track a rhino? Children were tested on both knowledge (what they just learned about animals) and their intent to adopt a conservation activity (i.e. their intent to do something that would help wildlife and wild places). For example, “If you could do one of these activities at home, which one would you choose?”

**Pilot Testing of Study Materials**

To test the reliability of all photographs used in the study, we pilot tested the materials with local children enrolled in Zoo Day Camp in our target age group. Our criterion for accepting a photograph was that 12 out of 14 children identified the picture correctly without the interviewer using any prompts. We also pretested all interview questions to be sure that our language was understandable for children ages 5-8 years old.

**Study Group**

In designing the study, we first identified three of the six KDC locations where we would conduct the assessment. The three locations were selected by: 1) the nature of the activity location (we needed sufficient room to place display boards used to collect data), and 2) by the number of guests visiting the site (we needed sufficient number of guests passing through the area to serve as potential subjects). Kids’ Discover Clubs at Dinoland, Africa and Conservation Station were selected as study sites.
Children were selected randomly for the study by being the ‘next child’ into the KDC area. After the KDC interaction, the interviewer approached a parent and said that we were studying our KDC and would they agree to having their child(ren) participate. If the parent agreed, the interviewer brought the child and parent to the interview site, located just steps away from the KDC site.

Data were collected by two members of the Disney’s Animal Kingdom Education team (1 interviewer, 1 data recorder). To assess a child’s knowledge, we used a simple multiple choice format that consisted of two knowledge questions that were verbally delivered to each child. A group of photos were displayed on a board as possible answers to the questions. Each photograph included the written word(s) that described the picture. The photos included one correct response, three incorrect responses and one response that showed a ‘?’ and read ‘I don’t know.’

Each picture was placed on the vertical display board in random order and read aloud to the child. The pictures also included the written word(s) that described the picture. The child was asked to point to the picture that represented his/her response. The same methodology was used for the two conservation questions, however, in selecting a conservation activity card there were no incorrect responses and the cards included a ‘nothing’ and an ‘I don’t know’ response.

Control Group
A control group of 132 children in our target audience was interviewed at the front of Disney’s Animal Kingdom and asked nearly the same knowledge and conservation behavior questions using the same methods as the study group. This control group served to identify what children already knew about the content of our KDC and to assess conservation activities before participating at a KDC activity. Comparing the two groups allowed us to measure the change in knowledge as a result of the KDC activity. Because of the age of our subjects each question was repeated twice, once at the beginning and then again after reviewing the photo options.

Measuring Knowledge
Here are examples of the first knowledge questions and photo response options at the three KDCs:

Knowledge questions included one correct response, 3 incorrect responses and an “I don’t know” card.

A second follow-up question was asked of children who answered the first knowledge question correctly. The second question was open-ended, more complex and addressed the comprehension of information. For example, the interviewer at Dinoland asked, “What do teeth tell us about what a dinosaur ate?”
Measuring Children’s Interest in Adopting Behaviors

A second series of questions in the study focused on conservation activities (i.e., what children can do to help wildlife and wild places). The intent of these questions was to assess children’s interest in implementing a conservation activity after participating in a KDC activity. Continuing with the format of using photographs, eight conservation activity cards were used in this part of the study. The selection of conservation activities for the response cards was based on the frequency that they were shared at the KDCs as part of regular programming previous to the study.

The child was asked “If you could do one of these activities at home, which one would you choose?” and “If you could do a second activity, which would you choose?”. The child chose from the set of conservation activity cards that illustrated conservation activities that they could do to help wildlife and wild places.

Parent Involvement

We made the assumption that children in this age group need the assistance of their parents to perform conservation behaviors (i.e. help wildlife and wild places). To identify any possible barriers that the parents had to the activities that their child chose (thus diminishing the chance of the child completing the behavior), the parent was asked if the first choice activity was one the child could do at home. If the parent expressed concerns, the interviewer asked about the second choice.

Once a conservation activity was identified with no parental barriers, the interviewer asked the child why that specific activity was chosen. The child was then given a self-addressed, stamped postcard that illustrated the chosen activity and the child was asked to return the postcard when the activity was completed.

Results and Discussion

The outcome knowledge of the children who experienced our KDCs was significantly higher than that of our control group. This suggests that young children 5-8 can recall and comprehend new wildlife information shared in a fast-paced, free-choice, theme-park setting conducted by trained educators.

Children demonstrated an ability to not only recall information but also to comprehend or understand the information in a more complex way. When asked the comprehension questions below, children were able to provide a correct narrative response at the following percentages.
Further, our results showed that children want to help wildlife and have clear preferences for particular conservation activities. Their top selections were behaviors that bring them closest to animals including 'look for animals,' 'hang a birdhouse,' and 'look for animal clues.' Through their open-ended responses, children were able to connect the activities that they chose with a positive impact on wildlife/environment. Most of the children’s top reasons for selecting a conservation behavior indicated their interest in helping wildlife (see Table 2 for responses.) Their least favorite activity was 'collect pennies' which suggests that many of the 5-8 year olds did not understand how money helps wildlife. This behavior is probably better suited to older children who understand this connection.

By asking children to return the postcard after completing their conservation activity, we know that some of the children actually did carry out the activity that they selected. About sixty-two children, or 11% of our sample group, returned postcards to us stating they completed the activity. So, in a small subset of children, we were able to demonstrate the completion of a conservation activity in a small subset of children. We observed that parents are very supportive of assisting their children with conservation behaviors that are simple and age appropriate. Very few parents in our study identified any barriers to the behaviors their children selected.

Conservation educators know that the positive results of this study are no accident. At every step along the way educators work diligently to deliver fun, engaging activities for young children. Extensive interpretive training, daily coaching, consistent delivery of age-appropriate conservation messages, and creating experiences that are fun, positive interactions, are critical to setting the stage for positive results.

Ultimately, this study supports our belief that if we want children to take action to help protect wildlife and the environment, we must offer conservation activities both within the zoo experience and in their home lives that the children enjoy and that their parents will support.

Table 2  Summary of Children’s Responses to “Why did you choose this activity (conservation behavior)?” (Listed in order from most popular behavior to least popular.)

<table>
<thead>
<tr>
<th>Conservation Behavior Selected by Child</th>
<th>Top reason why selected</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Look for animals</td>
<td>I like animals</td>
<td>23%</td>
</tr>
<tr>
<td></td>
<td>It's fun</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td>Learn more about animals</td>
<td>21%</td>
</tr>
<tr>
<td>2. Hang a bird house</td>
<td>Caring for animals</td>
<td>52%</td>
</tr>
<tr>
<td>3. Look for animal clues</td>
<td>Learn more about animals/explore</td>
<td>59%</td>
</tr>
<tr>
<td>4. Pick up litter</td>
<td>Caring for animals</td>
<td>65%</td>
</tr>
<tr>
<td>5. Plant a tree</td>
<td>Caring for animals and the environment</td>
<td>47%</td>
</tr>
<tr>
<td>6. Recycle</td>
<td>Caring for animals and the environment</td>
<td>65%</td>
</tr>
<tr>
<td>7. Learn more</td>
<td>I like animals</td>
<td>37%</td>
</tr>
<tr>
<td>8. Collect pennies</td>
<td>Caring for animals and the environment</td>
<td>34%</td>
</tr>
<tr>
<td></td>
<td>Children could not connect this action with a benefit to animals</td>
<td>32%</td>
</tr>
</tbody>
</table>
Zoo self-guided trails can offer a cost effective ‘activity’ for visitors from a wide range of backgrounds with inexpensive or reusable materials. Moreover, they can offer new ways of seeing the zoo throughout the year, providing a changing focus for repeat visitors and presenting serious conservation messages in an entertaining and interactive way.

At Newquay Zoo, a wide range of self-guided activity trails have been run since 1996, winning a commendation for these in the BIAZA education awards in 2001.

Materials and methods
Personal Digital Assistants (PDAs) and IT technology are not necessary to run good trails. One method of producing an inexpensive trail at Newquay Zoo is to offer visitors a free A4 guided map with trail clues. These are easily photocopied and available at the zoo entrance from a series of leaflet holders. The trail leads visitors around the zoo to find a series of colourful painted clipboards or temporary A4 or A3 sign frames. These trail boards hold laminated sheets which, like the clue sheets, can be easily produced and printed using simple Desk Top Publishing (DTP) packages such as Microsoft Publisher. A ‘prize draw’ box is placed in the zoo shop (or zoo exit) to encourage completion of trail sheets. Results are monitored and collated on a database, then original sheets are shredded and recycled. Another possibility is to distribute trail sheets through your website as a downloadable pdf file for visitors to print off before visiting the zoo.

Puzzles, code breaking, clues and clever ways to conceal answers
These all work well on trail maps or sheets to record answers. For any trail, a focus or completion point such as revealing an answer or codeword may be used. This can be revealed or hidden through anagrams (rearranging or scrambled letters e.g. ‘snoil’ for ‘lions’), riddles, acrostics or the crossword clue approach (e.g. write in answers and in the shaded areas is your clue word). ‘Lift the flap’ and ‘true or false’ flaps to make finding the clue or answer more interactive. ‘Dungeons and Dragons’ or key trail approaches (“If you choose X … then go to point 5 …”) are more complicated to organise and follow. Similarly visitors can answer questions, find facts and clues along the way or solve a clue to look for the location of a hidden answer (somewhere in the zoo such as behind or under something!). The less writing involved is generally the better option. Map reading and orienteering skills are also possible to introduce if the zoo map is divided up into grid squares and questions based on specific information which is not general knowledge (even down to dates and inscriptions on memorial seats). Similarly, your existing animal information signs can be used as the source of information if you are not allowed to clutter up your zoo park with ‘more signs’, however beautifully designed your trail boards might be. This is similar to a treasure or scavenger hunt and GPRS geo-caching (suitable if you have a very big zoo park!). These encourage people to visit different parts of the zoo and look at unfamiliar or less popular animals, as well as teaching both map and team-building skills.

Don’t worry! You’ve done all this before…
Tilden’s (1957) famous ‘Six Principles of Interpretation’ are relevant both to trails and normal zoo signage.
Interpretive trails should, as Veverka (1998) summarises Tilden, ‘provoke, relate and reveal’ the message you want to communicate. Completing a trail and solving clues is one form of ‘revelation’. The dinosaur, lost explorer, plant hunter or turtle-eating pirate with a parrot on his shoulder are good imaginative ways (even useful guide characters) to communicate such serious and weighty issues as extinction, exploration, conservation, biodiversity, hunting and habitat loss in a way that is designed to ‘provoke’ curiosity amongst or ‘relate’ to the background interests of visitors. Wider issues of multicultural or gender balance can help to broaden the appeal to a varied audience.

Many of the skills and design factors involved in setting up trails are shared with zoo signage and interpretation such as font, background colour and siting. However attractive an ‘olde worlde’ pirate trail in old handwriting script might appear, this is usually tiring on the eye or unreadable to many people. A little bit of atmosphere can be created by sparing use of unusual font styles. One style exception here is the hand drawn map of fantastic and fabulous journeys such as J.R.R. Tolkein’s *The Hobbit*, C.S. Lewis’ *Narnia* books or *Treasure Island* by R. L. Stevenson.

By their very nature, trail signs are linked and spread out over a distance. It is often a good idea to avoid a set route that signs must be visited in as this creates crowd problems. Alternatively you can use a central point of the zoo as a ‘compass rose’ pictured on the ground to start and end each section of a trail. In linear sites such as an aquarium, visitor flow and crowd control are important here if you want to avoid people going against the flow to complete or check the trail. Older or movement impaired visitors might not enjoy crisscrossing your site or walking a huge distance. If we were planning a guided tour, we would have to consider these elements in person. A self-guided trail is little different.

Levels or layers of trails can be adapted to different groups or audiences through picking out different elements on trail board signs to give the answer or the clue sheets can be changed over time to give renewed interest.

**Results**

**Knowing more about your audience:**

**Evaluation and ‘soft’ market research**

Who is your trail designed for? Which target audience? Who is picking up, doing or purchasing your trails? Remember that we as zoo educators do not exist in our visitor profile – what we find interesting or wish to ‘tell’ visitors is not necessarily what they want to know.

You can use prize draw information (name, gender, age and address, postcode) to develop broad visitor profiles for the purpose of matching trails to visitors, considering the appropriate level of language, relevance and attractiveness of theme. Work within the guidelines of your national data protection legislation for this ‘volunteered’ information, especially with young people’s details. Make it clear that you do not pass on or use this personal information for any other purpose, make results non-attributable and dispose of sheets responsibly.

The kind of information you can compile from trail sheets includes home origin e.g. local or out of area / country), age and gender. Are trails taken up by local people or holidaymakers? Regular or first time visitors? Are trails completed by more boys or girls? What is the age of the child (in the family) taking part?

More formal evaluation can involve coding the first 100 sheets given out or sold each day. How many of these sheets do you get back or are correctly completed? Do sheets need to be fully completed for them to yield valuable information? This is important when families are sharing the activity with easily tired young children. Check completed sheets in the first trial days of a new
trail to make sure that it is not too complicated or confusing, seeing where and how people misinterpret clues, information and instructions. Soft evaluation and pre-testing also involves trying out the trail for a few days before its public launch. Other zoo staff can road-test new trails for you if they have not been involved in their creation.

Once started, check for damage to the trail from time to time by walking the trail route, checking trail points and reviewing completed sheets. It is not only visitors who can accidentally or deliberately ‘spike’ a trail by removing panels. Maintenance teams have an uncanny habit of removing trail boards when painting or repairing fences and never putting them back. Always keep copies of trail signs, even simple photocopies, so that any missing or damaged signs can be quickly replaced or reprinted.

A prize draw for entries and an attractive drop off space in your shop or volunteer station incentivise the visitor to complete the trail. Incentives range from simple stickers, certificates and colouring sheets to a prize draw for chocolate, shop goodies or books (the last three being easily posted). Well chosen prizes, a themed display in your zoo shop or display cases of linked objects around the zoo can be used to enhance the message of the trail, capitalise on interest (‘must buy a book on dinosaurs!’) or even conceal vital clues to complete the trail.

Staff in costume, suitable posters and other forms of publicity all add to the sense of the launch and trail being an event worth visiting the zoo for or adding value and interest to regular visits. Exciting partnerships with other organisations such as museums or galleries are also possible such as the Darwin 200 celebrations.

**Sources of ideas**

When brainstorming themes for trails, look at the forthcoming year(s) and developments in your zoo. Web resources such as event listings, ‘date-a-base’ type sites used by journalists (often subscription based) or free sites like Wikipedia are useful for looking up anniversaries. Use your own childhood library and also the children’s sections of bookshops and libraries. Keep a scrapbook or notebook of future ideas for trails. Past ideas or illustrations for Newquay Zoo trails have come from old cigarette or tea cards, stamps, *Top Trumps* fact and trading cards, Guinness world records, toy catalogues, games in children’s magazines, cereal packets, game and puzzle books, Christmas activity gift sets or annuals, and classic or topical films (*Nemo*, *Lion King*, *Madagascar*, *Indiana Jones*, *Harry Potter*). Beware infringing copyright using illustrations such as Disney’s *The Jungle Book* or other licensed characters. Other sources of inspiration are online games or other zoo, museum and galleries’ trails and games. Board games (both good, bad and boring) once celebrated or cashed in on topical events and also passed on instruction and information, especially on an otherwise dull Sunday. The play element is important; hopefully, visitors might not realise playfully that they are learning something. Once out of new ideas, revisit and update successful past trails as dinosaurs, explorers or pirates never go out of fashion.

**Conclusions: Why do visitors like trails?**

I remember a group of traveller children who were outside normal schooling and visiting a zoo for the first time. They were energetically following a self-guided trail with real rivalry to complete it before
others, some almost bribing me to give them pointers. In the past trail signs have gone missing, perhaps to spike the chances of others completing them and entering a prize draw, so signs need to be securely placed. At other times, parents have been unable to leave the zoo until their child has completed the trail.

Whilst trails can be too complex and clues too well hidden, good trails offer:
- Value added to your zoo visit, especially if the trail is free
- Completion and closure
- ‘Something to do’ and an informal learning objective
- Competition and lure of possible prize draw entry
However if your trail is confusing, damaged or incomplete, you can reverse the positive factors above – you’ve lost zoo friends and happy customers.

Possible reasons for offering trails or certain themes include:
- To fulfil learning or curriculum objectives
- Communicating conservation and education mission statements of the zoo in an unfamiliar way
- Through simple evaluation, to learn more about your zoo visitors.
- To support fundraising and awareness raising parts of campaign objectives (e.g. WAZA Year of The Frog campaign).

**CHECKLIST: TEN CRITICAL FACTORS FOR FAILURE**

1. How many trail clues is too many? (10 to 12 in practice is probably enough)
2. Is the trail (physically) accessible? (Disability discrimination factors here?)
3. Is the trail board and trail sheet print or font size too small, off-putting or too complicated to read?
4. How long does the trail take to physically walk around and complete? (Don’t test this yourself as you know the answers, routes and your zoo site).
5. Can visitors vandalise or ‘spike’ the trail by removing boards or clues?
6. Can keepers and curators inadvertently ‘spike’ the trail by moving animals or will sections of the zoo become inaccessible as building work happens?
7. Can people guess the answer without doing too much or any of the trail?
8. Can animals ‘spike’ the trail by inconveniently dying or will plants be visible or in bloom for all the time a plant trail be running?
9. Are the relevant trail sign boards easily distinguished from other zoo sign boards or other trail boards if you have several trails running at a time?
10. Does the trail have wide and long running relevance to visitors or will it be too topical and quickly soon passé? (Christmas, Olympics etc)

**TWENTY POPULAR TRAIL TOPICS**

1. Dodos, dinosaurs and dragons: endangered ‘last chance to see’ animals or animal constellations, mythical animals, heraldic and other fabulous beasts.
2. Topical events such as world sporting events featuring flags, facts and participants from around the world or ‘animal athletes’, Chinese New Year, solar Eclipses and state occasions.
3. Multicultural and historical themes ranging from Greeks to Victorians, explorers, the history of zoos, symbolism and portrayal of animals (art, habitats, animals, beliefs).
4. EAZA, IZE or WAZA Campaign links.
5. Continents, areas or countries (Madagascar, Africa) through their flags, stamps, currencies or national animals and plants.
6. Habitats (rainforests, deserts) and travels, explorers and pirates.
7. Specific animal focus e.g. tiger, turtle, penguins, nocturnal animals or carnivores.
8. Animal groups ranging from ‘mammals’ to families (e.g. rodents) and collective nouns for groups of animals.
9. Creative arts – poetry, art trails, recycled metal sculpture trails, literacy and numeracy.
11. Specific 'naming' events such as names or dates near to antelope, Mermaid sign next to your zoo lake.
12. Unusual local personalities, folk tales, animal stories and Halloween ghost stories.
13. Plant or tree trails including plant hunters and discoverers / introductions, plant lore.
14. Preschool and young zoologists trail: colours, shapes, basic literacy and numeracy.
15. Comparisons trails: How are animals like humans? What have we learned from animals? What can spies learn from animals?
16. Languages, travel phrases and animal names in French, Spanish, Cornish, Swahili...
17. Bushcraft skills, sun safety, survival tips, paw prints and spooring trails (Mystery animal?)
18. Anniversaries – Christmas (pantomime animals), Easter (egg) trails, birthdays (zoo birthdays, centenaries, animal birthdays), Darwin 200 or a ‘Zoo history’ tour of photographs of the changing zoo through time.
20. Sensory (Special Needs) trails featuring ‘look, listen, touch points’ around your zoo of noisy animals, birdsong, interesting tree or plant textures and naturally smelly animal areas.

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8. Animal groups ranging from ‘mammals’ to families (e.g. rodents) and collective nouns for groups of animals.
9. Creative arts – poetry, art trails, recycled metal sculpture trails, literacy and numeracy.
11. Colour, pattern and camouflage based trails.
12. Unusual local personalities, folk tales, animal stories and Halloween ghost stories.
13. Plant or tree trails including plant hunters and discoverers / introductions, plant lore.
14. Preschool and young zoologists trail: colours, shapes, basic literacy and numeracy.
15. Comparisons trails: How are animals like humans? What have we learned from animals? What can spies learn from animals? How animal areas relate to or have similarities with detectives, secret agents, CSI, army, navy and air forces past and present.
16. Languages, travel phrases and animal names in French, Spanish, Cornish, Swahili...
17. Bushcraft skills, sun safety, survival tips, paw prints and spooring trails (Mystery animal?).
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**Author Contact Details:** Mark Norris | mark.norris@newquayzoo.org.uk


This article is based on a workshop I led on trails at a BIAZA education meeting at Woburn Safari Park in 2004. Thanks to all involved.

All photos © Mark Norris | Newquay Zoo
Do you ever wonder if a visit to your aquarium or zoo has any lasting effect on your guests? If all your efforts to inspire, engage and empower visitors about ocean conservation really have an impact? Most aquariums are driven by ocean conservation missions, but it’s hard to know if you’re accomplishing that mission.

For the most part, we never hear from the vast majority of our visitors, and probably won’t find out if their visit had any impact on their lives, either positive or negative. But since the mission of the Monterey Bay Aquarium is ‘to inspire conservation of the oceans,’ we were determined to learn – systematically – who we’re inspiring, to what extent we’re fulfilling our mission, and how. To find the answers, we embarked on a research project in 2006 called the ‘Inspiring Ocean Conservation Study.’

Methodology
We started our study by developing a logic model that described the conservation outcomes for a typical visit. The research was divided into three phases: an exit survey to look at visitor outcomes immediately after the visit (Phase 1), a six-month follow-up using a web survey (Phase 2), and a whole-visit timing-and-tracking study (Phase 3). Phases 1 and 2 are complete, as is data collection for Phase 3 – this paper will focus on the initial two phases only.
With the help of staff from all areas of the aquarium, including our restaurant and gift shops, we identified a number of visitor outcomes that might indicate we were achieving our mission. For example, before their visit, we hoped visitors would be excited and know what to expect when they arrived, be aware of the Aquarium’s commitment to conservation, and regard us as a trusted voice for the ocean. During their visit, we expected visitors to have an enjoyable experience, build a stronger emotional connection to the oceans, increase their level of knowledge about ocean life, become more aware of ocean conservation issues, and take home a meaningful souvenir. After a visit, we expected them to feel excited about visiting again, continue to learn about topics related to their visit, take some personal action on behalf of the oceans, and become part of the aquarium’s constituency.

For Phase 1, the on-site study, we collected data during summer (August and September) and winter (November) of 2006. We intercepted visitors as they left the aquarium and collected a total of 1,005 completed written surveys, with a response rate of about 44%. The survey took about 20 minutes to complete (a significant time commitment), and since we indicated this to visitors up front, we felt the response rate was acceptable.

Phase 2 of the study involved contacting respondents from the on-site survey six months after their visit. We had 360 respondents, or about a 34% response rate. We offered an incentive to participate, and sent them a reminder to complete the survey.

It is well documented that in any study of this type some respondents may respond more favorably than is actually the case. As a result, we’ve been careful to examine the data from both a qualitative as well as a quantitative viewpoint. The findings reported here represent a ‘best case’ scenario for fulfilling our mission – what can happen during a visit to the aquarium. While there may be some response bias we were unable to observe, it’s clear that we have abundant evidence that visitors are inspired, and this inspiration can lead to action.

Findings and Implications
To help illustrate some of the findings, I will profile several actual visitors who participated in both the on-site and web follow-up surveys.

**VISITOR #283 PROFILE**
- Female, 51 years old
- Belongs to a conservation group
- Not a member of Monterey Bay Aquarium
- Repeat visitor (more than 5 years since last visit)
- Reason for visit: actively supports ocean conservation

**VISITOR #283** came alone and stayed for three hours. She’s a strong representative of what we’re calling the ‘conservation-oriented’ visitor. These quotes are from her web survey:

“I’ve always believed in ocean conservation, but feel stronger about it and inspired to be more pro-active since my visit to the aquarium.”

Here’s how she responded to the question:

‘What have you done differently since your visit?’
- Participated in coastal cleanup, try to be a more meticulous recycler, use less plastic bags, try to educate others when possible.”

One of our most important findings is that nearly 90% of on-site visitors agreed that their visit inspired them to ‘want to help conserve the oceans.’ Visitors of all types, even those who rated their overall visit low on the satisfaction scale, reported that they were inspired by their visit. And 94% of web respondents said they remembered feeling inspired six months later.

Here’s someone on the other end of the spectrum, the one person out of ten who wasn’t inspired:

**VISITOR #310 PROFILE**
- Male, 65 years old
- Doesn’t belong to a conservation group
- Not a member of Monterey Bay Aquarium
- Repeat visitor (been once in past 5 years)
- Reason for visit: seeing the animals

**VISITOR #310** came with his wife and said he wasn’t inspired about ocean conservation during his visit and wasn’t inspired to do something differently six months later. Here are some of his quotes from the web survey:

“I think the conservation concerns are exaggerated and overblown.”
“Return to the early days of the aquarium and make it just a fun place to visit without the overwhelming propaganda campaign. I get tired of being ‘preached to’ everywhere I go.”

Even though he wasn’t inspired and didn’t appreciate the conservation messages, he stayed for five hours and commented on the web survey that his visit was “Absolutely wonderful. So fascinating we spent 3 times as much time there as intended.”

Another key finding of the study is that some experiences at the aquarium are more strongly associated with increasing visitors’ conservation knowledge, feelings, attitudes, and behaviors. The more of these experiences visitors have, the more likely they are to show gains in conservation outcomes. These experiences are:

- Interacting with a staff member or a volunteer about ocean conservation
- Picking up a Seafood Watch pocket guide
- Visiting exhibits with a strong and explicit conservation focus
- Watching a program (feeding demonstration, auditorium presentation or deck programs)

These experiences also tend to be associated with stronger conservation outcomes after the visit. In addition, there were significant differences between visitors who had two or more of these experiences and those who didn’t – they were more inspired, more satisfied, and reported having more educational and entertaining visits.

It’s not surprising that, without reinforcement, our visitors’ feelings and intentions to act diminish with time. This finding indicates that we should take advantage of visitors’ peak levels of inspiration by offering more opportunities for them to take action while they’re still at the aquarium – like at our Take Action exhibit – and then reinforce that behavior afterwards, for example by having them send an electronic postcard to themselves or others. The Take Action exhibit has recruited thousands of visitors to join our Ocean Action Team. In return, they receive regular updates and calls to action via Aquarium e-mails (see www.mbayaq.org/oa/).
One of the assumptions in our logic model was that the more someone visits the Aquarium, the greater their inspiration and inclination to take some kind of conservation action. However, our findings indicated this wasn’t the case, since first-time visitors were just as inspired and likely to act as were repeat visitors and Aquarium members. This is partly explained by the high level of inspiration members report upon arriving at the Aquarium, which makes it hard to show a change. It doesn’t mean that there aren’t differences between members and non-members, but we need more information about how visitors view their membership. It also reinforces an assumption that we had from the beginning of the study – that we need to rethink our typical way of defining a person’s level of involvement with the Aquarium and look at new ways of classifying our visitors.

An interesting outcome of our research is that we’re starting to identify visitors who, in general, have higher conservation outcomes. The next visitor is an example of one of these emerging segments.

**VISITOR #93 PROFILE**
- Female, 71 years old
- Doesn’t belong to a conservation group
- Not a member of Monterey Bay Aquarium
- First-time visitor
- Reason for visit: values the aquarium’s reputation as a good place to visit

VISITOR #93 came alone and stayed about 1.5 hours. She didn’t visit any of our ‘conservation exhibitions,’ but did see several auditorium programs. She also talked with our staff. Here’s what she told us in her web survey.

“I never realized the damage that we are doing to our ‘friends’ who live in the ocean by not practicing good conservation practices.”

“Only visiting the ocean once a year and then for several months only, it had not been on my priority list. I now am aware of the need for conservation, where before I was probably indifferent.”

“I would like to volunteer in Jupiter, Florida where I spend the winter. I am particularly interested in the loggerhead turtles and plan to check out the volunteer program at the loggerhead conservation area there.”

This leads to another key finding: visitor identities and some visitor demographics make a difference when it comes to conservation outcomes. We found that females and older visitors scored higher on conservation attitude, knowledge, and action scales than other visitors did. Overall, greater conservation outcomes were seen in:

- Women (compared to men)
- Adults with children (compared to those without children)
- Those visiting for educational or consolidation reasons
- Members of a conservation group or those with a strong passion for the ocean

Another segment of visitors that began to emerge was the ‘socially-minded’ – mostly people visiting with children to facilitate learning or as a social outing.

**VISITOR #377 PROFILE**
- Female, 40 years old
- Doesn’t belong to a conservation group
- Not a member of Monterey Bay Aquarium
- Repeat visitor (visited twice in past 5 years)
- Reason for visiting: values the aquarium’s reputation as a good place to visit

VISITOR #377 was here with her children ages one and four. They stayed for 4.5 hours. When asked in the web survey what she was inspired by, she replied:

“I felt closer to the ocean with the exhibit and directly felt responsible to do anything within my power to help conserve the oceans after this visit, though I went five times in my youth. Having children and really taking the time to see the exhibits inspired me.”

Here’s what she’s doing differently six months after her visit:

“I’m officially a supporter … meaning I will now stand up at any meeting to remind people about our responsibility. I never had a ‘voice’ about it before. Before my last visit, I didn’t think or hope that I could make a difference.”

When asked about the amount of conservation information currently presented in the aquarium, 81% of visitors felt that the amount was ‘just right.’ Seventeen percent said it was ‘not enough,’ and a small percentage (2%) felt it was ‘too much.’ Clearly, most visitors are receptive to our messages, and they’re looking for suggestions about how they can make a personal contribution to conserving oceans.
Our most successful messages about action relate to buying sustainable seafood – the relentless integration of this message into exhibitions, programs, staff interactions, and our website is clearly having an impact. Sixty-four percent of web respondents said their visit inspired them to ‘do something new or different’ and the most common action was choosing sustainable seafood. Distributing the Aquarium’s Seafood Watch pocket guide seems to be a particularly effective approach, as it provides visitors with a specific set of actions and a tool to reinforce behavior after the visit.

One last visitor illustrates an issue that emerged in the study.

Conservation-oriented VISITOR #156 stayed for 2.5 hours. He didn’t visit any ‘conservation exhibitions’ or see any programs, but did he talk with staff at some point. He falls into the uninspired group, but for a very specific reason. From his web survey:

“The message was completely lost on me. The place was a circus. Noisy, crowded, confusing. For the life of me I can’t possibly understand how you can get your purpose communicated. I’m a college grad, support Environmental Defense Fund a lot, plus other environmental causes… but the atmosphere was not conducive to the communication of your mission.”

“I recall the physical aquarium, but not your message. My sense is, then and now, that very little, if any, is being done about ocean conservation.”

About 20% of visitors in the study cited something that prevented them from having an enjoyable experience; the number one problem mentioned was crowding (the Aquarium’s attendance is about 1.8 million visits annually). This study is the first time we’ve documented that crowding has a negative association with being inspired to conserve the ocean. It’s not just a customer service issue – it conflicts with our ability to inspire ocean conservation.

We have completed data collection in the third and final phase of the research, which involves conducting a whole-visit timing-and-tracking study to get a clearer picture of how visitors are actually spending their time with us. 102 visitors allowed us to record what they did, starting with a brief pre-visit interview, and ending with a 15-minute debrief of their experience. We’re currently analyzing the data to apply them to what we’ve already learned from the first two phases of the study.

Conclusions

The Inspiring Ocean Conservation Study confirms that the Monterey Bay Aquarium is having a positive impact on the conservation outcomes of our visitors. It also highlights some things that we should focus on to maximize that impact: encouraging staff to interact with visitors; doing more to promote our on-site programs; finding special ways to engage older visitors and women, who are particularly receptive to conservation messages; offering opportunities for visitors to take immediate action and helping reinforce those actions; and reducing the effects of crowding.

Mission accomplished? In many ways, yes, but it’s an on-going challenge and we’re far from done!

### VISITOR #156 PROFILE
- Male, 67 years old
- Belongs to several conservation groups
- Not a member of Monterey Bay Aquarium
- First-time visitor
- Reason for visit: celebrating a special occasion with family and friends

Author Contact Details: Cynthia Vernon | cvernon@mbayaq.org

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But crocodiles aren’t really bright green are they…?
Using art to rediscover animals at the zoo

Children in developed and developing countries are experiencing a distancing from nature as they are increasingly drawn into a ‘virtual’ world saturated with signs and other images (Louv 2005; Lurçat 2002). A visit to the zoo to experience close encounters with real animals can be part of an antidote to this distancing and isolation. But to what extent does zoo education help children to really ‘see’ their animals and to discover their uniqueness?

This paper examines the modest experience of using sketchbooks to draw (and think about) real animals in a small zoo at Bettembourg in Luxembourg. As active observation, discovering, and learning through questioning is one of the core methods in this zoo’s education, the complementary work with an artist seemed to add an interesting and vivid experience. The aim was to enhance interpretation by raising the interest of the ‘little artists’ for animal matters, especially the fine details one risks overlooking during a normal visit to the zoo.

The experience gained during the pilot project ‘DA VINCI UND SO WEITER’ confirms that the use of the sketchbook is pertinent in dealing with increasing problems of lack of patience and perseverance manifested by contemporary schoolchildren. Using a sketchbook obliges confrontations with the real world and stimulates the child’s innate curiosity. These aspects are discussed more fully in a previous study (Johnston 2008). This paper deals specifically with our experience of using nature sketchbooks within the context of workshops in a small zoo.

The workshop ‘warming up’

In 2007 and 2008 I – Alan Johnston – was invited by Sylvie Bonne to lead a total of 15 workshops for zoo public children and school classes aged 5-16 years at the Parc Merveilleux. Each workshop lasted two hours, including a short break of about 15 minutes. Artist and zoo educator worked together to cover artistic as well as interpretative aspects.

The children, their teachers and Zoo School staff gather in the zoo’s small cinema. I present myself and my work to the children sitting in a circle using a question-answer technique. We discuss the following questions: What is an artist/naturalist and how does he differ from other wildlife artists? What is or is not nature or natural? Is man nature? We then discuss the importance of ‘warming up’ and practice in both sport and music.

This is followed by several simple exercises to vary the pressure on a pencil line. The resulting drawings help me to judge the children’s drawing fluency and pinpoint individuals in need of extra help (e.g. children with psychomotor problems).

This interactive introduction lasts about 15 minutes and by this time we are rearing to go and draw in ‘Amazonia’ – the reconstructed ‘jungle’ space (the back door of the cinema leads directly into this zoo space).
**Drawing on location**

We start by drawing relatively sedentary animals: the Morelet’s crocodiles (*Crocodylus moreletii*) and yellow-foot tortoises (*Geochelone denticulata*). We look at their form and try to stop drawing stereotypic models out of our heads. We look at the individual animal and its details: the different colours, bands on tail, dragon-like scales on top of tail, other types of scales and folds. I use the metaphor of articulated armour to explain how the folds work. We count toes and look at hind foot webbing. Thus we learn to ‘see’ a crocodile that is very different from the bright green stereotypic dragon-like animals children tend to imagine. Here one should be aware of the danger of being too directive. A drawing of a moving crocodile with more than four legs is in fact quite realistic for the child. What is important is that we observe four legs and see the differences between the fore and hind legs even if we do not draw them the first time around. Equally important is to try to paint the crocodile’s greys and yellows. We do not sanction a bright green crocodile but ask the question “Are crocodiles really bright green?”.

**Applying Helpful Positive Criticism (HPC)**

I am always very positive and encouraging about a child’s artwork in the first instance. It is amazing to see the number of faces that light up at this and I sometimes wonder if my encouragement was the first they had ever received? This paves the way for a dose of HPC (Helpful Positive Criticism). We try to encourage self-evaluation by asking the children what they think could be better. I do not like to use the words ‘wrong’ or ‘fault’ because we can always do better. Many of our children are so afraid to make errors that they are completely blocked in their art-making. I use the pretence of being allergic to eraser dust to encourage no correction. We do new sketches instead, sometimes creating an unexpected ‘multiple’. The exception is for children that manifest an absolute need to use an eraser as in the case of children with dyspraxia or other disorders (Blake and Cassidy 1999; Penketh 2007). The children get into their drawings very quickly and we try to involve teaching and zoo school staff in follow up of individuals and their artworks. The children will soon compare their work with that of their peers! Therefore, we try not to favour any one drawing (or its maker) but try to underline the positive aspects in each drawing.

**Getting the details in**

Having drawn our crocodiles (in pencil, calligraphic black markers, bamboo pens or black biros), we go on to the application of colour washes. Depending on their previous level of instruction, the children will have to be shown how to mix the colours. Again faces light up with pleasure as they discover that they can get the colours they want and the mixed colours keep their brilliance.

The Amazonian river fish are great subject matter (especially for the 5-8 year olds). They often do the same slow tour so a drawing can be made in steps. The thick glass walls of the aquarium can be transformed into a transparent ‘whiteboard’ with some fast drawing and a black marker pen to compare the fishes’ form and structure, the position of the mouth and its feeding. Our drawing of the boa constrictors was aided by Sylvie’s handling of a young boa which the children (and teachers) could touch. This hands-on approach reduces distancing to zero.

**Using active subjects**

Then the workshop progresses onto drawing moving subjects like the squirrel monkeys (*Saimiri boliviensis*). I try to get the children to draw lots of unfinished bits – details, to work on several drawings at the same time.
(8-12 years), and to draw in fast flowing lines from head to tail. We try to draw the subject without looking at the paper to ‘activate’ our so-called ‘right brain mode’ (Edwards 1989). We discuss how they move and how their structural anatomy helps them do it by using comparisons with our own legs, arms, etc. Drawing also obviously helps us to appreciate the monkey’s behavioural interactions.

Understanding structure and anatomy

The Humboldt penguins (*Spheniscus humboldti*) are great to draw. They are amorphous: changing shapes whether on land or in the water. For the kindergarten children, drawing the cages can be important. We looked at the many colours of the water and how the streams of bubbles rose from their backs. With older children, we try to compare gape-beak and gape-eye angles in order to appreciate proportions and individual face details. While struggling with the quasi-impossible proportions of Bennett’s wallabies (*Macropus rufogriseus*), or a guanaco’s (*Lama guanicoe*) face, I encourage some children to try to make small sculptures out of clay to help understand structure and anatomy.

Clay modelling works well with children of all ages. Working with clay calms them and re-centres their energy. It is fun and provides a complementary activity to concentrated observational drawing, opening up the fingers and three dimensional thinking! Zoo schools could perhaps consider inviting sculptors ‘in residence’ or profit from other artist’s residences.

Sculpting animals in a zoo is, in my opinion, important as it helps to counteract the effect of the stereotypic models in the form of soft toys that unfortunately overpopulate the shelves of many a zoo shop. How about trying to replace some of the soft toys with good quality sketchbooks and 4 b pencils embossed with the zoo’s logo?

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Clay modelling is great fun for all ages. Children can work in clay at all ages and develop their three-dimensional thinking and observational skills.

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**Drawing stimulates questioning**

I have been drawing animals for over thirty years now and it incessantly makes me question all sorts of things. Why are the upper parts of the Morelet’s crocodile’s teeth grey? Why do moustached emperor tamarins (*Saguinus imperator*) make bird-like calls? (Interestingly, the tamarins got very excited and started whistling loudly at my imitations of a tropical pigeon.) Do pigeons reveal food sources for tamarins and vice-versa? Are the disc-like depressions on the body of the electric-eel (*Electrophorus electricus*) pressure sensors as in European pike (*Esox lucius*)? Are Amazonian indian pottery decorations inspired by the graphic camouflaging diamonds of the boa constrictor?

I do not have all the answers to these questions but this questioning-through-drawing has great potential for zoo education staff if they draw themselves. It will take one out of the humdrum of seeing and being with the same animals day after day and provide one with much material for further research, not to mention the immense pleasure of drawing animals from life!

**Conclusion**

A ‘close encounter of the real kind’ with zoo animals is a positive experience, in a world where a growing number of children are being distanced from nature or a natural environment. Drawing from life during this encounter is, in our opinion, extremely beneficial to children of all ages. The wise use of relatively simple (but good quality) art materials can help children to learn to ‘look’ and ‘see’ real, live animals. The use of sketchbooks provokes a confrontation with the immediate environment and observational drawing can help to combat problems of lack of patience, perseverance and alienation from nature, providing an alternative to stereotypic models and image saturation in children and adults. The use of clay modelling can be an important complementary activity as is the keeping of a sketchbook by the zoo school’s staff.

This modest initiative was a very positive experience for ourselves, the children and the zoo education department. We had several classes and individuals returning for more. Rather than propose a model to be copied, we recommend that each zoo should try to fathom its own situation as a resource in terms of species, enclosures, children, artists and the school class facilities. In our opinion there is great potential for this kind of workshop activity. We hope that this paper will encourage readers to ‘have a go’ and organise art workshops themselves.

**Author Contact Details:** Alan Johnston | jhnst@pt.lu; Sylvie Bonne | zooschool@parc-merveilleux.lu

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