



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

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

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

Editor: Stephen Woollard

Contact IZE: For general enquiries please visit the IZE website: www.izea.net Members can also contact their regional representatives - as listed under the 'Board Members' page of the website.

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From the IZE President, Rachel Lowry

The 2012 IZE membership survey highlights that the **IZE journal** is highly valued by our members. Upon reflecting on this year's publication, it's easy to see why. The IZE journal provides a unique insight and snapshot into our industry each year, capturing many of the zoo-based education milestones and challenge of our time.

Having recently reviewed the past 5 issues, it is evident that as a collective we are recognising that we are one of the single most powerful conservation education movements across the world. What other industry has the face to face reach that we do? What other industry has the privilege of connecting people to some of the world's most rare and precious species in the ways that we can?

I'm incredibly excited to be President of IZE at this point in time, and proud to be working in an industry that strives to not only connect people with nature, but influence them to protect it.

As the IZE board prepares for the **2014 conference to be hosted by Hong Kong Ocean Park**, we're working to ensure that the composition and quality of the speakers, workshops and papers will help us tackle some of the big questions of our time. What does a successful zoo-based learning experience look like? Can they be fun, meaningful and financially sustainable? How do we evaluate whether we are influencing the right attitudes, knowledge and behaviours? How do we make the best use of technology and social media? And are we really building a social movement that benefits wildlife? Should we? Could we? I'm really looking forward to seeing you all in Hong Kong next year to participate in the next wave of discussions, networking and inspiration that as zoo and aquarium educators we can't get by without! See you there?!

I hope that you find lots of inspiration in this journal, and wish you all the very best as you identify innovative ways to support the **United Nations Decade on Biodiversity**.

Congratulations must go to Stephen Woollard, our Journal Editor, and the talented team of regional representatives that have helped bring this journal to our membership.

Please do continue to renew your membership as an institution or individual, your support really does help to build a more effective and united zoo and aquarium-based education network.

I look forward to working with you in upcoming years. We certainly have a lot to look forward to as we continue to minimise our ecological footprints and utilise education as a tool to fight extinction.



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Editorial, Stephen Woollard swoollard@rzss.org.uk

The International Zoo Educators association is now into its 5th decade, having been founded in 1972, and I am honoured and delighted to be the 21st IZE journal editor. Over the years each editor has helped to advance the profession of zoo and aquarium education and I have a tough act to follow. Fortunately, I am supported by a great team of regional editors and a vibrant and active IZE membership, as demonstrated at our IZE Chester conference last year and by the diversity and strength of articles in this edition of the journal.

As readers of previous journals will notice, I have made some changes to layout and design which hopefully meets your approval and continues to represent our profession well. The articles show the global reach of IZE with submissions from all the continents (except Antarctica - unlikely we'll have a member based there I think). I am already looking forward to reading submissions for the 2014 journal - send them in to your regional editors please.

In this modern age of social media and internet communication some may wonder if we still need a printed journal. Whilst we do make our past journals accessible online, the printed copy is a valuable tool and resource. Whilst some of you may walk around everywhere with a smartphone or tablet device, there is something special about the physical act of holding and reading a journal, and it has the advantage of being able to be left for others to read, to pass onto colleagues and share with senior staff. Having been involved in zoo education for over a quarter of a century I have seen many changes in society and technology and the ability to travel and communicate globally and many innovations in our work, but it is clear, and reflected in the articles, that our work in connecting people with nature and providing real experiences and activities, is needed now more than ever.

The importance of providing learning opportunities is well summarised by the oft quoted Senegalese environmentalist Baba Dioum, "*In the end we will conserve only what we love; we will love only what we understand; and we will understand only what we have been taught.*" I think we can add definition to what is meant by being 'taught' - it's not about lecturing or preaching, its about engaging with and experiencing nature and the world around us. Hopefully the content of this journal goes a small way to support Zoo, Aquarium and Reserve educators using the opportunities we have to really affect the future of our planet.



Foreword: Gerald Dick, Executive Director, WAZA

WAZA Project: Decade on Biodiversity

The World Association of Zoos and Aquariums (WAZA), and its members, with their experience in awareness raising and interaction with the public, are well positioned to help educate the public about the need to protect biodiversity during the Decade on Biodiversity. Indeed, during its 66th Annual conference WAZA members unanimously endorsed the UN Decade on Biodiversity and supported both the Aichi Biodiversity targets and a WAZA global project supporting both the Decade and the Aichi targets.

Therefore, together with a selection of more than 30 zoos and aquariums in six different regions of the world, a modular set of awareness raising tools are being developed as a recognisable framework, but adaptable to regional, cultural and individual institutional situations. These tools will then be made available to the whole WAZA membership.

These tools will include films of different lengths, an educational one of 13 minutes and a 3 minutes and 30 sec one for busier places in zoos and aquariums as well as for website use. A mobile phone / tablet application, a social media campaign and visuals (posters). The central objective of the project is to make sure the public understands biodiversity and its threats, and conveying stimulating and positive messages about the importance of individual contributions towards biodiversity conservation, and how to act on an everyday basis to contribute to biodiversity conservation through a reduction in individual footprint. The aim is to contribute significantly to Aichi Target 1: *“By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably”*.

The target is to reach out to up to 700 million zoo/aquarium visitors (which represents 10% of the world population). The numerous conservation projects of the WAZA community are convincing arguments and the animals displayed in the WAZA members’ facilities are great ambassadors to increase public awareness and trigger action.

In parallel, in collaboration with Chester Zoo and The University of Warwick, WAZA is coordinating an evaluation of biodiversity literacy. This will be the first large scale global evaluation of the role of zoos and aquariums as education centres. This will be carried out through pre and post visit survey which will be carried out both before (2012/2013) and after (2014/2015), the implementation of the tools.

WAZA thanks CBSG and IZE for the support in identifying the awareness tools and the input especially in the concept phase of the development of the funding proposal, which was generously accepted by the Swiss based MAVA Foundation for Nature.

WAZA would be delighted to give you more information on this exciting project. Please contact Tiago Pinto-Pereira the WAZA Decade Project Manager e: tiago.pintopereira@waza.org

WAZA Biodiversity Literacy Survey at Sri Chamarajendra Zoological Gardens, Mysore, India

Rakhi (wrist band) used for the survey (front and back) designed and developed by Zoo Outreach Organization, India.



Where do I begin?

Starting an education department from scratch

Grant Aggett-Cox

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In 2010 the Umgeni River Bird Park (URBP) underwent a change in ownership and the position of education and marketing manager was created. With 11 years of show experience, I already had a background in education and was appointed to the position. Great news... now where do I start? This article will outline my journey from past, to present, and big plans for the future with a very limited budget.



For the last 20 years, our motto has been “Inspire to Conserve”. The challenge for me is to take that motto and integrate it into a formal education programme. Inspire can mean to influence or affect (www.dictionary.com) but how do you influence without forcing your opinions onto visitors? Helen Keller wrote

“The best things in the world cannot be seen or even touched. They must be felt with the heart.”

This has stuck with me as I have started to implement changes to our educational material and planned for the future. It is now my aim to change hearts and let visitors decide how they will take that feeling forward. By presenting educational material in a balanced way and by creating a rounded view on conservation, we aim to give visitors an experience which will inspire them to conserve.

Creating a mission statement

As an education department, we have a mission to:

1. Inspire every visitor in a positive way to do more, learn more and be actively involved in conservation.
2. Conserve energy, natural resources, habitats and wildlife of all forms in our country, neighbourhoods and own homes.
3. Educate and engage through multi-disciplined approaches to conservation education, being positive, proactive to changes in conservation education standards, un-biased in our approach to conservation education and creating an educational approach to reach a range of levels of visitors to our park.
4. Develop a long-term educational approach to meet future needs of our park and visitor expectations.

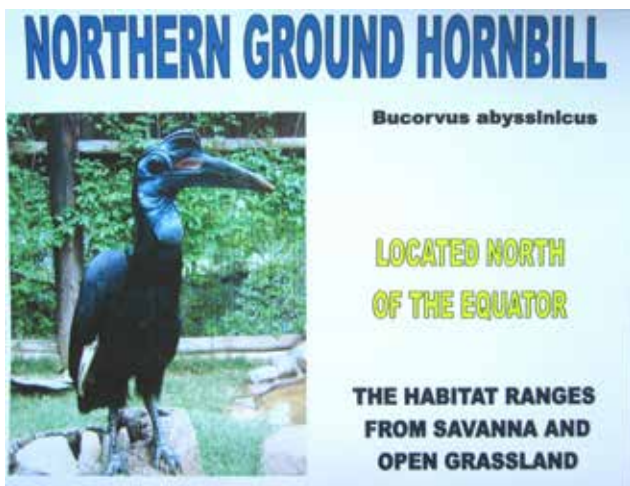
5. To create new educational exhibits, opportunities and experiences in the park to engage visitors in new ways.

Into Practice

By applying these mission statements in everything we do, we can create the change of heart needed to inspire our visitors. It's one thing to say this. Now the question is how to put that into practice.

1 - The first step towards inspiring visitors was changing our animal signage (see photographs page 6). The old signage was very basic and contained little to no meaningful information on the birds. The signs were also very small and badly placed on the enclosures. By making them four times larger, more colourful, adding in more graphics, more information and placing them in better positions in custom-made wooden frames, the change was dramatic. For the first time in many years, we could actually see visitors stopping to read the signs and we could also hear them discussing certain things from the signs. The basic message contained in these signs is also backed up by educational posters and information in our Education Centre.

2 - Installing recycling bins around the park was the first step to encourage visitors to conserve natural resources. Throughout the park we also make use of energy-saving light bulbs, have left areas of the park untouched as natural refuges for wild birds and animals, use no pesticides in our gardens and our gardens require very little watering.



An example of the old signage (above), and a new one (below) and new hand-painted board (right).



Future plans include a compost heap, earthworm farm, solar energy use in some areas, re-installing our bore-hole system, replacing as much exotic vegetation with indigenous plants as possible and also creating a seedling nursery with the aim of giving all learners a seedling to take back to their homes to plant as a way of offsetting some of their carbon footprint.

3. This is probably the most difficult mission statement to fulfil. The sheer diversity of visitors we have makes it difficult to put together a plan that will fit everybody. Being in a facility that is almost 30 years old also means that space was never allocated for educational exhibits during development. Space therefore is limited and any exhibit we create needs to take up as little room as possible whilst still being accessible and able to reach as wide an audience as possible. This means get creative and make a high impact with what we install.

Some of the exhibits we have already installed have made use of areas scheduled for development in the future and will move to other areas or stored for future use. Other planned exhibits will be mobile, allowing us to move them around the park, group them and also change them for different needs.

We also have a large number of visitors coming through for whom English is not a first language. The challenge here is to create something more visual and use the graphics to get the message across. We will be using pre-school children to test prototypes of these exhibits and their effectiveness before producing them for the park.

Producing material that is un-biased and also positive in its approach is also more challenging than many people realise. Coming from a show background, I always wanted visitors to leave the show knowing the real state of wildlife, but also

with a sense of hope for a better future - one they were involved in. Turning that experience and message into educational material has been more difficult. When talking one-on-one to a visitor, I can guide the conversation and have the opportunity for dialogue. A poster or sign though doesn't give any opportunity for dialogue. The message therefore needs to be the thing that guides the visitor and allows them to form their own opinion. The message needs to be brief enough to get the message across without losing impact. We are trying to limit writing on posters to what can be comfortably read in thirty seconds. Graphics with information panels make up the balance of the poster.

And then the personal touch. With just one educational staff member, having personal interactions is almost impossible. Guided tours for all schools are planned for the future and in the short-term, I am trying to get into the park at least once a week to chat with visitors, ask them about their visit, talk about birds they are looking at, ask what they would like to see and get general feedback. This helps to understand where the general knowledge level is when devising new material.

4 - This is largely covered by the above points but also includes a lot of research of other facilities,



joining organisations like the International Zoo Educators Association and online research. We are in the process of creating a library of reference material and surveys done in the park and this material will be used when looking at new educational exhibits, devising new programmes and for new ideas on engaging visitors in what we do.

Incorporating different learning styles

Leo Buscaglia said, *“It is paradoxical that many educators and parents still differentiate between a time for learning and a time for play without seeing the vital connection between them.”* This is a mistake we have made in the past and we are motivated to ensuring that what we do in the future marries the two together. Neil Fleming’s VAK/VARK model describes three main learning styles: Visual, Auditory and Kinesthetic. By acknowledging these styles and designing our programmes and material around them, we will have greater success in reaching our visitors.

Visual - in order to learn, the material needs to be seen. People with this learning style respond well to signage, information boards, posters and graphics. They also like to make their own notes and do well with worksheets where they can fill in the answers as they go around the facility. They also tend to remember more of what they have seen than what they have heard. As well as existing signs, posters, etc. we have more information boards being designed. These contain a limited amount of graphics and more general information. There are also plans in the future for electronic guides that can be loaded onto smartphones and tablets.

Auditory - in order to learn, the material needs to be heard. People with this learning style respond well to hearing information. They have good memories and can remember much of the information that they have heard. The free-flight bird show is the main area that caters for people with this learning style. Plans for the future include the electronic guides mentioned above, audio/visual presentations in our Education Centre and guided tours.

Kinesthetic - interacting with the information is how people with this learning style respond best. Touching exhibits, making enrichment devices, being a volunteer in a demonstration or presentation and being able to manipulate items on an exhibit work well for people with this learning style. Current exhibits include measuring signs, worksheets and a collection of bird skulls, feet, nests and eggs. Planned for the future are flip-cards on some enclosures, an interactive map, electronic guides and the volunteer section in the free-flight bird show.

Whilst we are aware of the different learning styles and how to create exhibits that appeal to each, our current and planned exhibits combine all three learning styles and appeal to all visitors to some degree.

Dealing with visitors on a more personal level

This is possibly the most important part of our job. Not everybody has the ability and charisma to deal with visitors. I have been to facilities where I have not been able to understand what the guide has been saying and where the keepers haven’t got much idea about the animals in their care. I have also been to facilities where I have been more interested in what I am being told than what I am looking at. Animal keepers are in general some of the most passionate people I have met and usually have a wealth of information that they are happy to share. The problem is how this information is presented to the visitors. By knowing how to talk to visitors, engaging them, understanding the different learning styles and how to be professional, an interaction with a visitor can be the most rewarding experience for both the staff member and the visitor.

The same rules apply to ‘show staff’ as they are currently the people having the most contact with visitors. We are still in the process of formalising the education plan to be followed by them which will be in line with our guidelines and protocols. We have five different presenters - all have their own style of and way of passing the message on to the visitors. This is very good on one hand as it allows them to add their own personality to their shows. The disadvantage is that there are vast differences in how messages are passed on. I have stressed they must make a connection between the birds and the visitors. We are more likely to appreciate something we can relate to on some level.

I have put in place the 4 P’s of presenting a show for our staff - make it personal, positive, professional and passionate. The same guidelines are also being put in place for all our staff. Some of the P’s can be taught, but most should be part of our everyday lives as animal care professionals. How do we go about applying them in real life?

Personal - Without a personal connection to what is being seen or learnt, there is little chance a visitor will appreciate what they are experiencing.

An example of a lack of this personal touch came from one of our old presenters. Whilst presenting our barn owl in a show her dialogue was, “This is a barn owl. As you can see the barn owl has a heart-shaped face. They are found almost all over the world. They eat meat.” In a routine that lasted three minutes, this was her total dialogue. Whilst strictly speaking the facts were accurate, the style of speaking showed no connection between presenter, bird and audience. By weaving a story and using the owls’ name, the dialogue automatically becomes more personal and the audience forms a bond with the bird. The same rules apply if a keeper is talking to a visitor about birds in their sections.

By bringing in our own experiences with the birds, history in the park, and linking in with the visitors' own experiences and interests, we start the visitor on a road of awareness and appreciation that can last a lifetime. I have spent many hours talking to visitors about our birds, park, my history in the park and sharing stories and it is the personal connection with the birds and staff that can make or break a visitor's experience.

Positive - There is nothing more depressing to me than hearing about habitat destruction, illegal wildlife trade and dwindling animal numbers. Whilst it may be the reality, how it is presented can make the difference between depression and action. We have tried to balance our educational material around the park to not only show the reality, but also highlight the work being done to conserve and protect what is left. In the show too, humour is used along with a strong conservation message to create awareness and also foster hope for a better future. It is important to me to have our visitors leave with a sense of optimism and that their involvement can make a difference. If faced with the grim reality and hearing only the negative side of things, what is the point of supporting conservation bodies and projects? Our message needs to be uplifting and empowering if we are to change our visitor's hearts and minds.

Professional - This is one aspect of the job that cannot be compromised. Everything we do affects our animals and our visitors. Our Education Department's guidelines and protocols have been distributed to all staff and they will soon be taken through this document in great detail. Being a professional is not just about our general behaviour or knowledge, it is about being passionate about what we do, dealing in the correct manner with visitors, having a broad knowledge of conservation and our park, doing our work to the highest standards, being well presented in appearance and maintaining a positive attitude. By doing what we do to the highest standards possible, our visitors will notice and it will have a positive impact on their experience. This professional code also applies to our educational material with all posters, signage and other material being screened for errors and accuracy before being produced. We have had issues in the past with information being given being outdated and inaccurate. These errors can be avoided by proper planning and preparation. Being professional should be a way of life - not just part of our jobs.

Passion - This is one thing that cannot be taught. It is also for me the most important part of the job. Our passion for what we do shows in our body language, communications with the public, work ethic and enthusiasm for our facility.

There is a vast difference between passion and enthusiasm. We can be enthusiastic about our work but if we don't have a passion for what we do then the enthusiasm will fade and our work ethic and professionalism fades with it. Our passion also has the ability to affect our visitors in many ways. It can influence their perception of our facilities, what they are seeing and learning, and what they take away with them.

So with all the above points in mind, how do we put this into practice?

None of what we have done or propose to do would be possible without proper and thorough planning and research. One advantage I have had was that there weren't any educational structures in place so I could start with a clean slate. The difficulty though was trying to create a programme that will suit different ages, social backgrounds, interest levels, learning styles and make this work on a very limited budget and with a staff compliment of one person. By breaking the park down into sections, it was easier to formulate ideas as opposed to trying to create for the park as a whole. Having a common theme planned for all material also meant continuity. Creating a policy and procedure document played a large part in educating the staff on what we do, how we do it, how to deal with the public, and our plans for the future. This has created a common goal not only for the education department but for all the staff. It has not been a quick or easy road and I know there are still many challenges to come but I can already see the impact of the changes we have made.

By giving our visitors the tools they need to form their own opinions, to nurture a seed which may have already been planted and most importantly, to change their hearts, we will achieve our mission statements and goals.



Going beyond borders: The secrets behind our new animal identification labels

Paola Sierra and Katya Olmos, Barranquilla Zoo, Colombia

Introduction

Zoos and aquariums use diverse resources in order to attract their visitors and facilitate their learning processes. Interpretative devices, such as animal identification labels, are a common example of these resources, but our educators have not reached a consensus on the ideal design, mostly because the effectiveness of these devices is rarely evaluated. Usually, most identification labels include basic information about the animal, such as: common name, scientific name, place of origin, conservation status, and a picture or illustration, however, designers are focused on their ideas of what is the most relevant information, frequently ignoring visitors' expectations. Have we asked them? Do our identification labels respond to relevant tendencies, such as social media?

Interpretative devices and their design challenge

Interpretative devices could be powerful tools to accomplish our educational goals, but sadly, visitor studies carried out in museums, zoos, and aquariums, even our own, have shown that few visitors actually read them (Fraser, Bicknell, Sickler & Taylor, 2009, Gerritsen, 2008). In order to design successful educational resources, identification labels included, we have to go beyond the borders of our traditional design process, which is mostly a result of what educators think is relevant to convey to visitors. The Barranquilla Zoo recently carried out a redesign process of its identification labels that involved different evaluation strategies. The output is a device which integrates criteria such as usability, readability, social media trends and, most important, simplicity (Sagolla, 2009, Maeda, 2006).

Methods

In order to develop a new design, we followed a four-step process that took us a little more than a year. First, we collected identification labels' images from 100 zoos and aquariums around the world, compared them, classified the information into categories, and determined their frequency of use. Second, we asked our visitors which type of information they preferred to find and in which format they wanted to see it. Third, through focal groups, online surveys



and readability tests, our visitors selected the most appealing information to them and the most effective ways to display it. Finally, we reviewed some of the most successful social media trends, standards for friendly interface and usability criteria, such as text length and updates.

Results

Regarding the most common information found in the identification labels that we reviewed, place of origin, common names and scientific names were the most popular (over 70%), followed by information about the distribution area (89%), amazing facts (61%), and type of food (38%). On the other hand, few identification labels had information about the individuals or groups found at the exhibit (6%) and just 8% had any kind of interactivity.

We also discovered that visitors want to find less technical and more anecdotal information. They expect to learn about the species, but they also want to know what is happening with the specific individual or group they see at the exhibit. Moreover, they want to choose which information appeals the most to them, and they want to be able to easily understand it. They also proposed alternative designs for our identification labels, that abandoned the traditional rectangle shaped formats and included interactive features.

Reviewing the most popular social media trends, we found three important characteristics which could be transferred to our identification



labels: First, Twitter limits the number of characters that people can type to communicate their messages, forcing them to write in a simple and direct way. Second, web pages have hypertext. Through links, people can navigate and access the content they want, so they choose to read more or less from a specific subject. Finally, web pages, Facebook,

and other social media can be easily updated and people always find something new when they access them.

The output: an Identification Labels 2.0 model

With this in mind and after many failed prototypes, we came to a round-shaped turning model. This design, similar to a roulette, has two circular layers that are put together, but only the lower layer can be turned, allowing our visitors to access just the amount of information they want, while the upper layer remains static. The upper layer has a free quadrant, as to divide the circle in four pieces, but we removed one of them in order to display the information on the lower layer.

Based on the evaluation process, which included both our visitors' expectations and our educational objectives, we decided that we would display the information in four categories. We also included in our design the most relevant social media trends, such as simplicity, text length (no more than 25 words), and frequently updating.

Our new identification labels include the following four information categories:

- **Lets discover:** We promote visitors' interactions with the exhibit, asking them to see, compare or act in a specific way, which can help them understand the information displayed or notice an important feature about the species. We also establish connections among different animals, and compare them to something that is familiar to visitors. For example, in the ostrich (*Struthiocamelus*) identification label we ask our visitors to count the number of fingers that this animal has and to compare it with the number of fingers other birds have at the zoo. When people count and compare, they learn that ostriches have only two fingers, while other birds usually have three.

- **What is happening?** This is the identification label updatable ingredient. Using markers, we include information about the specific individual or group at the exhibit, such as: Why the male lion is not at the exhibit?

- **Surprise:** This is where we share amazing facts about the species. Our intention is to show people that animals have features and adaptations, which make them special.

- **Place of origin:** It includes information about the species' distribution in the wild.

Discussion

Our new identification labels have gone beyond our borders because they break the pattern of intuitive design and were created based on visitors' expectations and relevant format trends, such as social media.

Our visitor studies show that our new identification labels are more attractive to visitors compared to the old ones. They increase the amount of time visitors interact with them. One of our weaknesses is the unawareness of some visitors noticing that the device could be turned in order to reveal more (or less) information. We are looking for alternatives to overcome this difficulty and this is why evaluation is very important. Nevertheless, our new identification labels have proved being likely to convey our educational messages in a better way, helping us to reach our mission.

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Poop to Power: Turning Waste into Energy and Engaging Science Literacy at Denver Zoo

Sarah Metzger, Science Programs Specialist, Denver Zoo



Zoos and aquariums provide an excellent environment for life science studies. However, opportunities present themselves to study the physical sciences as well. Denver Zoo's "Poop to Power" program marries the science behind the process of biomass gasification with the ample amounts of waste and 'poop' produced from live critters on zoo grounds. The resulting program is able to meet the needs of both life and physical science school standards while expanding the zoo's offerings for education programs for its newest exhibit, Toyota Elephant Passage.

The design of Toyota Elephant Passage (TEP) started in 1993 and has evolved with Denver Zoo's master plan. Although the original idea was to build a state of the art elephant facility, the sustainable incorporations have quickly changed the facility on an operational level. Incorporating a "Waste to Energy" Gasification system along with other sustainable features garnered the Denver Zoo the first "Greenest Zoo" award by the Association of Zoos and Aquariums in 2011. Gasification will convert 90% of the zoo's current waste stream into useable power to heat water and buildings in the exhibit. This effort will divert over 1.5 million pounds of visitor waste and animal poop from the landfill annually.

Education programming to highlight biomass gasification and sustainability at Denver Zoo was the next step. Denver Zoo's Education Department worked alongside the zoo's Capital Planning Department to create sustainable programming for schools and teachers that complement Toyota Elephant Passage.

The first program created was a science lab for middle and high school students that would educate them about what Denver Zoo was trying to achieve through hands on inquiry.

Rather than reading a lesson out of a textbook, students have the opportunity to be involved with a hands on, real world science as it's being applied to a new setting: a zoo exhibit. Gasification is not a new technology, but it is being applied in an innovative way to help power the Toyota Elephant Passage exhibit. By seeing science in action outside the classroom, students may feel more empowered or inspired to embrace science (Yocco, et. al 2011). Learning about renewable energy is important for this up and coming generation of students.

Gasification itself has been around for over 100 years (Hutchison, 2009). The process involves solid fuel being heated to a high temperature in a low oxygen environment. The resulting thermal chemical conversion creates syngas, a combination of carbon monoxide, carbon dioxide, and hydrogen gas similar to natural gas (NETL, 2012).

In the Poop to Power Science Lab, students design, build, and test mini-gasifiers after receiving background information about gasification. The small scale design utilizes a large juice can, soup can, and tuna can to create a reactor capable of producing a small amount of syngas. All cans are

conveniently sourced through staff and zoo commissary discards. Although Denver Zoo's actual reactor will use animal poop, students use wood pellets as their biomass. Because the conversion of solid waste to gas requires a controlled oxygen environment, students must hypothesize how many holes they need to punch in each can to optimize the reactor for syngas production. Using a thermocouple in the interior, students monitor and graph the temperature of their reactor until syngas is achieved. A quick comparison of graphs allows students to discuss which reactor design optimized the production of syngas.

The 2007 study conducted by the Institute for Learning Innovation and the Association of Zoos and Aquariums discovered that zoos and aquariums can influence visitor's attitudes towards environmental problems (Falk et. al, 2007). Specifically, visitors left the zoo feeling like they could be part of the solution, a prerequisite to conservation action. While students will not be attempting to recreate a gasification system to provide energy for their homes, Poop to Power educates about other conservation strategies such as recycling and proper waste disposal which can be initiated anywhere.

By educating visitors and school groups about Denver Zoo's process of "waste to energy" the zoo can hopefully instill positive attitudes towards our efforts. Eventually, Denver Zoo hopes the same positive attitudes will



affect long term behaviors in individuals trying to conserve or find new means of sustainable or alternate energy sources.

As more zoos attempt to incorporate sustainability components into their exhibits and the way their zoos are operated, physical science programming can take root by incorporating these efforts into education program offerings for schools. With limitations on budgets and resources, there is an increasing need for teachers to be able to justify a field trip or enrichment program outside of school grounds. STEM (science, technology, engineering, and math) has become a hot buzzword in the National Science Standards for schools (Brown, et. al 2011). By meeting the science standards on a state and national level, school administrators have a greater capacity to approve funding for teachers to bring zoo programming into their classrooms.

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A thousand ways to educate people: the case of the 'grassmen' workshop at Zoomarine Italy

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1: Head of Education, Zoomarine Italy, Torvaianica (Rome)

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Educating people inside an amusement theme park is everything but a simple challenge. A theme park, such as Zoomarine is a free choice setting where the public choose what to see and what to hear. Although Zoomarine is a Zoological Garden hosting many fascinating animals (dolphins, seals, sea lions, tropical birds and birds of prey) most people seem not to have the right frame of mind to be educated about them, about the wild and about conservation, as they have so many other things to think about. This makes us ask a question: is Zoomarine a real free-choice setting? Or are the choices made by the public somehow and someway guided? If the answer is yes, as it seems to be, what is the driving force guiding the choice of the visitors?

Marketing and communication. This is the answer.

Since the first grand opening of the park, communication has been directed one way only: a focus on dolphins! Dolphins are the most valuable creatures hosted at Zoomarine, the most loved animals by the visitors, the most known and unusual animals to see into a zoo. Dolphins are also the animals around which, during the last century, there have been so many legends and false beliefs, generating something like a general foolish feeling about them. Most of the people visiting a dolphinarium are convinced that dolphins are special creatures (but what about a sloth? or ants? or even cockroaches?) that need special handling (what about bats?) because they have a special power (they come from another planet or what?). Marketing and communication, the TV especially, has resulted in many misconceptions of the audience and the results is a mistaken view on the conservation priority. Dolphins (*Tursiops truncatus*) are not in danger! Many bats (that people dislike), for example, need a great commitment to be saved along with many other animals and plans people are not so interested in.

Of course the Department of Education and Science, working in the park, always acts to give the public the correct view of all the animals hosted. The shows are in fact educational with a voice-over talking about them, about their biology, ecology and actions everyone can carry out to enhance their protection. And here we are, back at the very first line of this article: how difficult it is to catch the attention of someone that already possesses, or believe they have, the knowledge. So what's the solution? A Trojan Horse - a fish hook that during the past season we identified as the 'grass man'!



The majority of the visitors are represented by families with kids and kids are much more friendly and open minded about nature than their parents. So why not to catch them first with a simple but impressive craft activity and keep the parents occupied too? Try and educate, using the same tool, for parents and kids.

So the 'grassmen workshop' was born this way and gave the unexpected results shown below.

When: the do-it-yourself grassman workshop was offered to the public on three important days. The Earth Day on April 22nd, the World Environment Day on June 5th and a few days after on World Ocean Day on June 8th. The aim for the Department of Education and Science on those days was to educate people about nature conservation, about responsible fishery in the ocean and about the correct use of natural resources.

How: The biologist of the department set up a gazebo for the grassman workshop that took place all day long.

But **what is a grassman?** The grassman is a very simple craft activity for kids that is done with materials everyone can find at home. What you need to make a grassman is:

- sawdust;
- grass seeds;
- stocking;
- markers or color to draw the face of the grassman.

Put a handful of seeds inside the stocking then fill it with sawdust in order to create a round shape. Close the stocking with a knot, that will be the lower part of the grassman, and draw a face with a marker pen. Last thing to do, once at home, is to moisten the grass man so that it will have a fabulous 'green hair' in a few days!

Results: The activity was a great success. Kids stopped, magnetically attracted by the grassman and parents followed them; the skilled biologist made the rest involving everyone in interesting and educative discussions and role playing about the topic of the day. More than 400 grassmen took life in those three days, giving the biologists so many educational opportunities.

The grassman itself is a powerful educating object: it allows you to recycle materials that would usually be thrown away, it gives kids something which is ready in a few minutes they can go back home with and, most important, the grassman is a living thing you need to care about.

The do-it-yourself grassman workshop was a great success and had also the aim to collect money for an association involved in the conservation of the monk seal in the Mediterranean Sea.



Zoo Connect – Extending the ‘Happy Hour’

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Abstract

Fundamental to discussions around Sustainability and Environmental Education amongst Taronga Zoo Educators is the potential to include pre and post visit activities into the students learning agenda designed to extend their learning experiences. This agenda is to increase the chance of positive behaviour change, past the 4 hours approximately schools spend in zoo grounds on excursions and should their teachers choose to book into and attend them, the 45-60 minutes they spend with a specific Zoo Educator in a dedicated curriculum lesson. In August 2011, an initial trial was conducted by the NSW Department of Education and Communities, Curriculum and Learning Innovation Centre and Taronga Zoo Education Centre using a webinar program, Adobe Connect. This trial attempted to reconnect with Year 7 students from Carlingford High School who had attended a Taronga face-to-face lesson delivered by Kerry Staker, and to ‘extend their happy hour’, as well as to explore the potential of Adobe Connect, and similar software for all schools though NSW. After the success of this original effort, a pre-excursion tutorial was delivered to kindergarteners at Beacon Hill and Schofield Public Schools, who then attended a face-to-face lesson with the same teacher, Kerry Staker. The onsite excursion and lesson was then followed up with a post-visit Adobe Connect session in which Kerry Staker and fellow Taronga Educator, Rod Cheal, delivered the lesson and asked for specific actions to be acted upon by students and teachers at the school. The third lesson was ‘Animals of the Dreaming’ delivered by Taronga Aboriginal elder, Col Hardy, and Taronga educator Kerry Staker. Mr Hardy’s Dreamtime songs and stories, accompanied by live footage of the Education Centre animals were sent via Adobe Connect to remote indigenous schools in Toomelah Public School and Lightning Ridge Central School. A repeat of the original Classification lesson trial was conducted in June 2012 with Year 7 students from Epping Boys High School to reassess and verify some of the outcomes achieved by that particular trial. This paper is a case study of the trials of this technology and its potential use in the future to assist zoos and other environmental education facilities to improve their blended teaching methods and advance their desired results for conservation education.

Background

Adobe Connect™

Adobe Connect (AC) is an online web conferencing platform for meetings, seminars and eLearning sessions. It allows various ‘pods’ to display an attendance list, live web cam interviews, multiple choice polls, chats, video and Microsoft PowerPoints to be seen over an overall layout, all devised and determined prior to the lesson starting. AC sessions are hosted and run by an ‘administrator’, in this case the zoo teacher, and attended by ‘guests’, the participating onsite classroom teachers and their students. The trial lesson was named Zoo Connect. The zoo teacher, or host, must invite the students into the session by providing to

the classroom teacher, a specific URL address prior to the session. This was done by confirmation email, and the classroom teacher then shared that address with the students in the class. A strong wired internet connection is required at both ends for the best results, as poor quality connections cause videos to lag and audio to skip. During these trials the maximum number of connected participants was 36, 28 of which were students at individual PCs in a computer lab at Carlingford High School, others being the Zoo Educators and observing researchers from Swinburne University (Doube & Salomon, 2012) and CLIC. Figure 1 shows the AC configuration in the initial Zoo Connect trial.

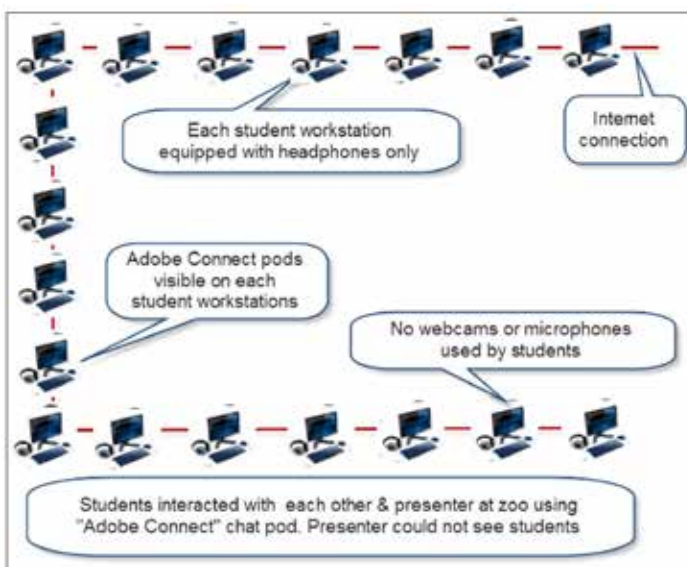


Figure 1 – AC configuration during Zoo Connect. Courtesy of Stephen Sergis NSW CLIC

The Trial

The project was conceived by educators and program developers within the New South Wales Department of Education and Training (NSW DET), Curriculum Learning Innovation Centre (CLIC) in expectation of the surge of digital classrooms and technology-assisted education. CLIC staff approached Taronga Zoo Education Centre (TZEC) as a fellow DET provider and part of CLIC itself. Zoo Educator, Kerry Staker, was assigned the particular task of working on the project and other TZEC educators were introduced as support teachers in some of the trials. The primary objective of the trial was to test the Adobe Connect platform, determine its efficacy and value in an e-classroom of the future, taking into account the usability, levels of on-task student's interaction and engagement demonstrated. Taronga teachers had a secondary objective to explore the possibilities to add value to their current lesson format and increase the likelihood that students would have greater opportunities to connect more with wildlife and make changes in their behaviour that would ensure a positive environmental outcome.

The Zoo Connect Lesson

The face-to-face lesson content was taken from the Australian NSW DET Science Syllabus for Stage 4, namely 12 and 13 year old students in their first year of high school. The lesson was heavily accessed with approximately 16500 students participating in the lesson during the 2012 school year. Delivered at the Taronga Learning Centre by Taronga Educators on a regular basis, the lesson was called and advertised under the name 'Creature Classification'.

Outcomes relevant to the lesson were to:

1. Describe features of living things.
2. Classify living things according to structural features and identify that they have patterns of similarity and difference.

During the Adobe trial session, held a week later with students in their schools computer lab and Taronga teachers in an office at the TZEC, Taronga Educator Kerry Staker spoke live to the students through the Webcam pod. She also opened up a Chat Pod allowing students, who were without the capacity to ask live verbal questions, could make comments and ask written 'chat' questions. At other times the zoo teacher added multiple choice quizzes, video casts and surveys. The lesson, which lasted approximately 50 minutes, took this overall format:

- An attendance pod registered students as they logged on to the session with face-to-face assistance from their own teachers and DET CLIC staff on site.
- A video was played to refresh the student's memory of their visit and to allow them to test and adjust sound levels in their head sets.
- A pre-test pod of multiple choice questions regarding their lesson at the zoo.
- Two PowerPoint presentations with live narration by the Taronga teacher.
- Webcam of the Taronga teacher with a live animal to illustrate the lesson.

The screenshot displays the Adobe Connect 'Zoo-Connect' meeting interface. On the left, a participant list shows names such as Kerry from Taronga, Julia Wilson, Rachel 2, Jordan Shu, Carlin, Matilda Howard, Rachel, Song Fang, Thomas G, Thomas C, Lydia, christopher, James, Chris Nguyen, Mvin Mathew, Renise, Michelle, Gilbert, Efa, Alyssa, Benjamin, Charles Pierotti, guest, guest 2, Joshua, Peter Holtzner, Shi Hao Hong, stephen, and Zakharai. The central video feed shows a koala in a wooden enclosure. The chat window on the right contains a transcript of messages, including 'Edai: hello', 'Alysa: sup peeps!!!', 'Julia Wilson: hello', 'Song Fang: hi', 'Jordan Shu: hey', 'Rachel: hi!!!', 'Mvin Mathew: ...', 'thomas go third to chat', 'Benjamin: hello', 'Caitlin: h!!!!!!!', 'Michelle: :)', 'Chris Nguyen: well this is awkward...', 'matilda Howard: whor rachel 2', 'Zakharai: hey', 'Kerry from Taronga: hi guys can you hear us?', 'Mvin Mathew: no', 'Joshua: no', 'james: no', 'matilda Howard: no', 'Rachel 2: no :((', 'Song Fang: very awkward', 'Gilbert: No', 'Joshua: P', 'thomas G: This is so far ...', 'Shi Hao Hong: HE', 'Alysa: no', 'thomas G: nope', 'Julia Wilson: no keep', 'Chris Nguyen: nah TF...TF', 'Rachel: no!', 'Zakharai: no', 'Edai: no', 'Song Fang: no'. The Taronga Zoo logo is visible in the bottom right corner.

Post-test with similar questions to reassess the students learning.

- Experience survey to assess the student's enjoyment of this style of learning.

Figure 2 (opposite below) shows from Left-Right – The Attendance List Pod, Share Pod (in this case showing a video), Welcome Banner Pod, Chat Pod, and Webcam Pod with the Zoo Teacher and the Taronga logo in a Share Pod; all active over the Layout design showing students on the grass with an echidna nearby. When pods are closed by the presenter the layout is revealed as stimulus in its own right.

Research Design

In all, 111 students participated in the webinar lesson on 'Creature Classification' delivered over AC. The research used both quantitative and qualitative methods. A control lesson was delivered by a teacher at the schools and the subject matter to be taught was shared by the Taronga teachers to the class teachers to ensure similar content was delivered by the zoo teachers and the classroom teacher, this included Powerpoints and video. Student's behaviour was videoed in both lessons and analysed by Swinburne University (Doube & Salomon, 2012) to assess the student's on-task vs. off-task time. Of the 111 students, 100 returned pre and post test results and 73 completed lesson experience surveys.

Results

Results confirmed that AC is an effective learning tool. Pre and post test scores were tested and showed higher positive outcomes in the test group as opposed to the control group. According to Swinburne University (Doube & Salomon, 2012), the 'qualitative findings support the quantitative data in suggesting technology was the major contributing factor.' Student responses to the experience survey conducted at the end of the session revealed the students enjoyed the sessions and were appreciative of the remote learning experience. The webcam presentation and live animal access invoked enthusiastic responses and many commented on 'how lucky they were' and 'wished they could do lessons like this everyday'. Both teachers and students commented that vision of a live expert and animals enhanced their potential learning experience and enriched the outcomes of the tutorial. Both the students and the Taronga teacher stated that the technology was easy to use and that they could apply it in less than two minutes. However the classroom teachers were more hesitant and stated they would require further training to

feel confident. The only negative responses were a result of poor bandwidth speed which caused some blurred or frozen images and distorted sound and lag times at the students' end. The teachers who prepared the initial session stated that the set up time was lengthy, (up to a few hours), but no more than when learning any other new technological teaching tool. Once created however, the Taronga teacher could, and has, used the same layout and material over again. In contrast to predictions by teachers, students behaviour was not as difficult to manage over the AC as revealed by the videos taken by Doube & Salomon where students sat quietly and typed intensely.

Figure 3 - Chat Pod and Teacher in Webcam



The Chat Pod was the most revealing tool in the AC session. A staggering 795 entries were recorded in the first session and 1165 in the second. This created for the students a unique opportunity to look to peers for answers to questions or to join in conversation, which in turn created a sense of community and collegial learning. These chat comments were recorded and analysed by Doube and Saloman, and off-task chatting was minimal in the first session, with 'silly' comments being censored by the students themselves. In the second session, when the 'silly' comments occurred, it took only a second for the Zoo teacher to shut down the pod and remind the students verbally that their behaviour and comments were being recorded, thus ceasing all such off task comments. One Taronga teacher, who attempted to manage the chat pod alone in one session found this difficult while delivering verbal content, but could see how simply removing the chat pod and therefore restricting the students opportunities to 'chat' could re-focus their attention.

Figure 4 – Spontaneous Chat Pod comments from students as teacher finished the lesson

Impressions of the Sessions Chat

thomas g: AWESOME
 Thomas C: This was awesome
 Eda: its fun.....
 james: ikr
 Chris Nguyen: awesome session 8D
 Jordan Shiu: awesome
 Renee: great
 Rachel 2: Bring more animals ???
 Benjamin: ikr
 Caitlin: It ROX!!!!!!!!!!!!
 thomas g: better than skewl
 Rachel 2: Yes
 Song Fang: awesome session
 Michelle: cool!!!
 Zakharia: it was good i liked it
 Joshua: 7 outta 10
 Shi Hao Hong: yep i enjoyed it definately
 Lydia: a lot
 Gilbert: revolutionary!
 Jordan Shiu: yp
 Julia Wilson: it was interactive and a fun lesson
 Jordan Shiu: yep
 Rachel 2: maybe bring in a orangutan :)
 Rachel: it was great! "D
 Alyssa: i loved this lesson. It was the best ever!
 Matilda Howard: yeah, but i couldn't tpye fast enuf
 Caitlin: 15 OUT OF 10
 Song Fang: agreed thomas g
 Eda: the animals were cute.... more live animals
 Jordan Shiu: btter thanfb
 Charles Pierotti: I've really enjoyed this session and hope we can do it again sometime!
 Rachel 2: loved it
 Mivin Mathew: it was very educative and informativei learnt new stuff
 Gilbert: great work

Barriers

While chat pod behaviour and management by teachers can be addressed by teachers, the bandwidth capacity of a school will be the most hindering factor in such technology. Students were most frustrated when, for example, the presenter's voice and photos were out of sync due to lag times, many commenting on the chat that they couldn't see and/or hear at times. With time, and the introduction of Education Priority National Broadband Network standards, this can hopefully be addressed. A more intricate threat was identified when teachers from the schools were interviewed. Unwillingness to learn, develop and use new technologies such as AC were identified by the teachers as the biggest hurdle in its operation. Only new teachers were willing to participate in the trial, some more experienced teachers were heavily encouraged by their Executive staff and at least one other flat out refused. Swinburne University researchers, Doube & Saloman, feel this refusal to accept AC stems from time demands and that teachers would be more likely to incorporate this technology into their programs if they could be made aware that their workload could reduce with successful execution, access to 'experts' and sharing resources.

Discussion:

New Opportunities to broaden Specialist Education Experiences no matter where students are. Technology like AC offers the chance for classroom teachers to bring in an 'expert' and see them in their live setting; the expert setting being anywhere in Australia, such as the laboratory of the CSIRO, an authors office where they are working on their next book or the wood work shop of a city tradesman. Schools with difficulties caused by distance, time or circumstance such as remote central school, hospital schools, and juvenile justice centres could access experts with such equipment and capability. As Zoo Schools are in short supply and high demand, techniques such as AC could be a valuable extension device.

During the trials held over 18 months, connecting with 11 schools, Taronga teachers felt engaged with students and felt that they had a longer term connection with them that could prove beneficial in attempting to pass on lifelong conservation messages. While the 'Creature Classification' lesson outlined in this paper does not very strongly lend itself to a call to action for conservation, Taronga teachers felt it could be used in such a manner with that goal for other lessons.

Figure 5 (next page top) - Students showed photos of their practical task

Schofields Public School



The Kindergarten trial, for example, was the best example of this. The students met the Taronga teacher via AC a week before their face-to-face lesson and discussed what they were going to learn while on excursion at the zoo. Reconnecting with that teacher during their actual visit to the Taronga site enhanced this experience and built a relationship, in which the Taronga teacher, having previously liaised with the classroom teacher, asked the students to take action and build a habitat for a local species. Knowing they would see their Taronga teacher again, students were highly motivated to complete their task and build a 'lizard lounge' in their school garden so they could show photos and writing exercises about their task. When considering the long term messages modern environmental educators are aiming for, while at the same battling the minimal time spent with students face-to-face. In conclusion technologies like Adobe Connect are an absolute must into the future and as zoo educators, a way forward for our wildlife.

Follow-up

Since the trials of AC in 2011-2012, the NSW DET CLIC has been restructured and no longer exists as a unit within the New South Wales Department of Education. No further trials or roll out of AC technology is being explored at this time.

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Developing Local Community Theatre Program in Iran

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Despite of severe loss of wildlife during the past couple of decades, Iranian biodiversity is still ahead of a majority of other Middle Eastern countries. It holds the most viable populations of Asiatic cheetah and Persian leopard in the world. As the most charismatic mammals, both carnivores occupy the top of the food pyramid in a variety of Iranian habitats. Therefore, their survival is in close correlation with the suitability and integrity of their ecosystems.

The Asiatic cheetah (*Acinonyx jubatus venaticus*) is considered as one of the most endangered felids in the world (IUCN 2008). It was once distributed from the Indian subcontinent through Afghanistan, Turkmenistan and Iran to the Arabian Peninsula and Syria (Nowell & Jackson 1996), but in the past three decades, the occurrence of Asiatic cheetahs has only been confirmed from Iran, just a few dozen remained (Farhadinia 2004). Meanwhile, the animal suffered various threats, mainly due to human's who kill the animal because of lack of awareness.

Wildlife knowledge among the public is awfully scant, particularly local people who suppose the cheetah as an enemy to their stock and livelihood.

The endangered Persian leopard (*Panthera pardus saxicolor*) ranges over remote areas of west Asia; meanwhile, a considerable proportion of the subspecies population exists in Iran. Large areas of the country are still within the range of the Persian leopard and according to expert opinion, 550–850 animals exist in Iran.

Iranian Cheetah Society (ICS) is a non-governmental, non-profitable organization in order to save the last remnants of the Asiatic cheetah population as well as other large carnivores, particularly the Persian leopard. Besides field research programs to obtain ecological knowledge about these species and their range, educational and outreach programs compose a remarkable part of the ICS mission, particularly through developing community-based initiatives.

The ICS use this well-known quote of Baba Dioum a cornerstone of its method in educational activities: ***“For in the end, we will conserve only what we love. We will love only what we understand. We will understand only what we are taught.”***

In order to be effective, a variety of approaches have been applied since 2001 within urban and rural areas around protected areas for various target audiences, child to adult, educated to illiterate, men and women. Gradually, the ICS has been developing the most appropriate educational plan based on goals and target audiences traits. As a result, since 3 years ago “Conservation Theatres” project was begun.

Why Conservation Theatres?

In order to optimize our educational plan, a number of questions we try to answer:

What are our educational goals?

What is the place of implementation (indoor or outdoor)?

Whose are target audiences? School students, adults, shepherds, local authorities, women, men, hunter, etc.

How much time we have, is it a long term education program or a short term one?

Do target audiences ask to know more about this topic or we want to stimulate them to learn about it

During past decade, the ICS based on the above questions have developed various educational programs, and using our educational experience identified the need for an educational program that:

Attract audiences who don't have primary enthusiasm about the topic,

Can be implemented both indoor and outdoor (because equipment and facilities are not same around our country),

Be useful for various ages and kinds of audiences. For example different members of a family, children, father and mother, like it and learn from it.

Have flexibility to change context based on local problems (for example in some regions overgrazing is the major problem, and in some places poaching).

Be appropriate to short term educational program, and provide enough information in the time.

And, have a nice atmosphere that helps to build an emotional relationship between humans and the cheetah.

Consequently, ICS formed its theatre group in February 2011. 'Troubles of a Cheetah' was born.

Developing a theatre was a new experience for ICS, so we invited some theatre experts to cooperate with us. Finally, after 3 months, 'Troubles of a Cheetah' a theatre containing topics such as morphology features of cheetahs, differences between cheetah and leopard and treatments of cheetah in Iran was developed. This theatre has two characters, a cheetah and a hunter/shepherd (in middle of the show, the actor changes his outfit to become a shepherd to understand cheetah talks better). For more mobility and flexibility, stage equipment and outfits are very simplified. Moreover, a song was created support the theatre

Cheetah sings I'm your friend

As I mentioned before, 'Cheetah, Your friend' was created to support the theatre. While this song is an independent educational product and now ICS tends to create a video clip for it to release it independently. In this song a cheetah talks to audiences. For instance, he starts his song with these sentences:

"Don't be afraid of me, come closer, you are not my food" in follow up he describes his favorable food, his morphology, his habitat and at after explanation of various treatments that he faces in his life, he emphasizes that the Asiatic cheetah only lives in Iran now and we have to save it.

Traveling around Iran

'Troubles of a Cheetah' started its performances in Darabad Museum of Wildlife (Tehran). Then it was presented to protected areas authorities in Department of Environment of Iran (DoE) to issue the necessary permits to travel around Iran and to perform in rural and urban areas around protected areas where the habitat of Asiatic cheetah are. After this step, ICS Theatre group started its travel around Iran. Until now 'Troubles of a Cheetah' was performed in rural and urban areas around 9 protected areas and Tehran. That is, it was performed more than 30 times.

Alongside our performances, game wardens and local DoE authorities were invited to watch the show with local people and participate in it. After each performance is a good time to make conversation between local people and local DoE authorities and improving their relationship.



The theatre 'Troubles of A Cheetah' in Eshq Abad



Short speech by head of the CACP about the cheetah and locals' role to save it



*Local schools closed in Deyhouk for Theatre festival (above)
The theatre; 'Troubles of A Cheetah' in Deyhouk (below)*





The theatre; 'Troubles of A Cheetah' in Nayband village



Awarding students winning the art competition on Asiatic cheetah held by Ravar DoE



Discussion about the cheetah and other carnivores on educational posters "Morphological Comparison between Cheetah and Other Carnivores" in Rabat



In one of its last performances, it went to Tehran Zoo where there is a valuable collection of cats especially a Persian leopard. Tehran Zoo has visitors from around Iran as well as residents of Tehran. So, it's a relevant place to educate people about Asiatic Cheetah and other cats of Iran.

Combination of theatre and educational games

Educational games are the useful educational tools to increase the effectiveness of education. Various educational games were developed by ICS education team, and some of which were played in addition to performances. Educational games such as 'Cats Miniature jigsaw puzzle', 'Cats of Iran memory cards', 'Cheetah and Ladder' and 'Cheetah word puzzle'. These educational games are combination of fun and education and with them audiences would review issues that discussed in theatre one more time.

Leopard Theatre

After success of 'Troubles of a Cheetah' theatre, ICS theatre group expanded its activity by developing a theatre and a song about Persian leopards in early 2012. We hope this theatre has the same opportunity like the cheetah theatre to travel around Iran and help the conservation of Persian leopard.

Acknowledgement

'Troubles of a Cheetah' is a distinguished and successful educational program in Iran, based on cooperation of 41 staff, volunteers and friends of Iranian Cheetah Society (ICS). Furthermore, we are grateful to Conservation of Asiatic Cheetah Project in Iran (CACP), Iranian Department of Environment of Iran (DoE), US Columbus Zoo, Persian Wildlife Heritage Foundation (PWHF), and individual donors, particularly Saman Golriz for their support to develop and implement this project.

Youths participating in free discussion as the last episode of the festival in Rabat village





Elders describe their encounters with the cheetahs



The theatre; 'Troubles of A Cheetah' in Azadvar village



The theatre; 'Troubles of A Cheetah' in Tehran Zoo



Kids, adults and families try to solve the 'Cats Miniature jigsaw puzzle' in Tehran Zoo



Kids, adults and families play the big 'Cheetah and ladder' game in Tehran Zoo



Kids, adults and families play the big 'Cats of Iran memory card game' in Tehran Zoo

Zoo Theatre: A performance approach to conservation interpretation

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Abstract:

For centuries, theatre has brought communities together through stories, providing perspective on our place in the greater world. From the ancient Greeks to contemporary Broadway shows, theatre ignites discussion on society's most pressing issues. What better medium to engage zoo guests in thinking about challenging conservation topics? Our educational theatre programs have effectively interpreted 'carbon footprints', the palm oil crisis, sustainable fishing practices, and more – all while providing quality entertainment and enhancing the zoo visit.

In 2011, the Zoological Society of Milwaukee's Conservation Education Department launched Kohl's Wild Theatre (KWT), an ongoing program that provides conservation-themed performances using drama, songs, and puppetry for families at the Milwaukee County Zoo (Wisconsin, USA). KWT provides three types of programming: stage performances, at-exhibit performances, and outreach performances for schools and other community organizations.

Stage Performances

Each KWT show is designed to engage a family audience for 15 minutes and teach a basic conservation concept (see Table 1 for topics). Performances occur outdoors in an open-air theatre and are performed by three professional actors. All plays are developed in-house by staff or contracted playwrights. The writing process begins by selecting a featured animal species, a threat that animal faces in the wild, and a specific action that children can take at home to help (e.g., recycling electronics). This selection process is often influenced by current events, new additions to the animal collection, or other zoo initiatives that we want to highlight. Once topics are determined, the playwright submits a concept for approval and then writes an original play with all the core elements of drama, including plot, characters, theme, music, and technical elements such as sets, costumes, and puppets. Every play engages audiences through group sound effects, movements, and other styles of participation. This involvement helps connect audiences to the conservation behaviors being promoted. Shows are targeted for an elementary school-aged audience; however, many elements make the performance appealing to the whole family.



*The Strange Case of the Alien Invasion is a 15-minute play starring a detective trying to solve the mysteries behind invasive species. In this scene, an eastern tiger salamander (*Ambystoma tigrinum*) reacts to the presence of earthworms (*Lumbricus* spp.), animals that are invasive to Wisconsin forests.*

At-Exhibit Performances

At a fundamental level, our performances presented in front of zoo exhibits serve as interpretive devices. However the experience is not equivalent to what would be delivered by a docent (volunteer). A team of two actors travel to specific exhibits equipped with puppets, magic tricks and a variety of topical, 30-second skits.

At the exhibit, actors go into a set of 'structured improv'. This is the term we use to give actors the leeway to choose the tools that best serve the audience present. If there is a big crowd, the actors will jump into a 30-second skit to attract everyone's attention. If presenting to a handful of elementary-aged children, the actors might use an educationally-based magic trick. Or if the behavior of animals on exhibit is especially captivating, then the actors can put away the props and observe with the public, taking time to answer questions and point out valuable information.



*This two-person skit called **The Biodiversity Pep Rally** shares enthusiasm for all forms of life.*

Actors make fantastic interpreters because they are trained to connect with people on an emotional level and convey information in a meaningful way.

Outreach in the Community

In addition to on-site work at the zoo, our teams of

actors travel into the community to deliver 45-minute assembly programs for schools and community organizations. We offer three different program topics for schools to choose at any given time. The types of programs fall into three categories: short, medium, and long forms. Short-form programs consist of a series of five-minute skits



Whenever we travel to a venue, we provide our own sets, costumes, props, and sound system. Our sound technology includes wireless microphones, an operating console to manage sound cues backstage, an amplifier, and speakers. All we require of performance venues is a 5.5-by-6-meter performance space and a working electrical outlet.

Why No Animals?

We often get requests to include live animals in our presentations. The suggestion seems reasonable; we come from a zoo, after all. However, there are good reasons not to include live animals in this style of education. At a fundamental level, theatre is an exercise of imagination. Whether the audience is comprised of children or adults, watching a play demands the ability to suspend disbelief. To include a live animal in that process would distract the audience and dismantle the imaginary circumstances that have been established through the performance. Additionally, the inclusion of animals would limit our scheduling and travel flexibility. Animal welfare and management would become top priority, which would constrain our ability to perform in a variety of venues and circumstances. Live animal presentations are also already offered throughout our zoo to provide a variety of guest experiences.



***Bullies and Bonobos** is a “long form” outreach play that teaches concepts in great ape conservation and also explores the issue of bullying. The play highlights the bonobos’ (*Pan paniscus*) demonstrated capacity for empathy – a core concept in anti-bullying programs as well as in conservation education.*

Evaluation

Stated goals for KWT include educating audience members about wildlife, including challenges faced by animals and actions the audience can take to directly or indirectly protect animals. To gauge the success of KWT in meeting those goals, post-show interviews are conducted with groups who see a stage show at the zoo. Short interviews were also conducted with adults leaving exhibit spaces to compare knowledge gain at exhibits with and without actor-interpreters.

For outreach programs, feedback is collected from teachers and event organizers as to the perceived educational value of performances. In the first year of outreach programming, 90% of teachers said they were extremely likely to recommend KWT to others.

Results from the first two summers of KWT at the zoo indicate that conservation messages are effectively conveyed to zoo guests. In family interviews after stage performances, 93% of adults and 78% of children aged 6-12 years could name a threat to the animal featured in the play; 94% of adults and 60% of children aged 6-12 years could list something they could do at home to help wildlife.

Interpretation by actors at exhibits was also effective in educating the public. Adults leaving exhibit areas were asked if they recalled learning anything new while at the exhibit. Guests who encountered KWT actors could recall new information at higher rates (64% vs. 35%) than those who experienced exhibits without actor-interpreters.

The presentation of live theater complements other zoo-going experiences and is an effective interpretation tool. Our audiences respond positively to conservation messages reinforced by audience participation and memorable lyrics. We have witnessed zoo guests singing songs from our shows and discussing featured conservation messages as they move throughout the zoo. Theatrical techniques appear to be a powerful means to reach zoo guests emotionally as well as intellectually.

Table 1: Kohl's Wild Theater Performance Topics

Show Title	Conservation Message
A Climb Through Time	Palm oil crisis
Lights, Camera, Arctic!	Climate change and carbon footprints
The Mysterious Case of the Disappearing Bees	Colony collapse disorder
The Spot of the Jaguar	Deforestation and umbrella species
Treasure of the Sea	Sustainable seafood
The Great Wisconsin Zoo-per Bowl	Preserving Wisconsin habitats
Journey to the Rich Coast	Migratory bird conservation
The Strange Case of the Alien Invasion	Invasive species
The Legend of Hibernacula	Bat conservation
Bullies and Bonobos	Coltan recycling and promotion of empathy
Biodiversity Pep Rally	The interdependent nature of all species
The Bachelor-Pette	Challenges of exotic pets
The Wonderful Lizard of ooZ	Chytrid fungus and invasive pets
Dr McGhee Learns about the Sea	Ocean acidification

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All photos are courtesy of the Zoological Society of Milwaukee and Richard Brodzeller.

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Editor's note: Theatre or Theater? - In general throughout the journal the accepted English spelling of words has been used, so 'theatre' rather than theater (which is commonly used in 'American English'). The spelling of the word 'program' is now accepted English as well as the original English spelling, programme, so both spellings have been used in the journal.

Oh Man, Those Bears!

A New Enclosure in the Animal Park Bern for the National Present by Russia to Switzerland

Cornelia Mainini, Peter Schlup and Dr. Doris Slezak

Educational Department of the Animal Park Bern, Switzerland



Introduction

During a state visit to Switzerland in September 2009 by the Russian president Vladimir Medvedev, his wife Svetlana Medvedev brought two Siberian brown bears as an official present, weighting each about 22 pounds: Misha und Masha. Since these brown bears are amongst the largest subspecies of brown bears, the old enclosure in the Animal Park Bern originally housing Scandinavian brown bears had to be rebuilt. In May 2012, with much fanfare the new enclosure “BärenWald von Bern” (The Bear-Forest of Bern) was opened to the public.

The challenge for the Educational Department was twofold: First, information had to be attractive, modern and intriguing to delight visitors and inspire them to become involved. Secondly, within the exhibition the Animal Park Bern wanted to honor the official gift to Switzerland. It has been more than one hundred years since Russia gifted officially some of their treasured bears to another nation and we can anticipate regular visits from Russian diplomats to the Animal Park Bern.

Educational Exhibition with Misha und Masha

Bears in Russia

Bears play an important role in Russia. They represent strength and power but are further a spiritual link to the gods; hence people from this region worshiped bears for a long time. Already early on, children know the bear as a good-natured being. In Russian folklore, St. Nicholas or Santa Claus is not accompanied by a reindeer or a donkey, but by a bear. In many fairy tales the bear is a central figure, and children grow up with the bear being part of their childhood.

Results and Discussion

Russian Bears in Bern

As bears play such a significant role in Russia, a concern while planning the exhibition was the suitable appreciation of the Russian present – the two bears Misha and Masha – to Switzerland.

The enclosure is situated in the urban forest Dählhölzli, where a generous part was fenced in. To keep it near-natural, we left a large number of trees representing the huge Ussurian forest in a populated city as near as possible. Elements attractive for bears enriched the environment further: caves for the bears to hide in, climbing facilities, ponds and a little brook.

The so-called Bärenhaus (House of Bears) complementing the enclosure is a special piece of architecture, and won the "Prix Lignum 2012", a prize for special buildings made of wood. To honor the Russian gift, traditional Swiss craftsmanship was combined with natural materials to result in a wonderful and fascinating building containing traditional elements of Russian houses (Information <http://www.prixlignum.ch>).



The educational concept of the exhibition follows the theme "Man meets Bear". The German title "Mensch Bär!" is meant in two different ways. The first meaning is about the similarities and differences between man and bear and further the mythological significance of bears. The second understanding of the title points out that bears and their abilities repeatedly impress men and make them exclaim in astonishment or excitement. The exhibition intends to stress the two aspects: compare man and bear and learn about the astounding abilities of bears.

Bears are very curious. The exhibition animates the visitors to follow - like bears - their own curiosity and to discover many exciting and surprising details about bears in general, the Ussurian bears, in particular, and their environment.

The visitor enters the building through a labyrinth-like corridor designed after the bone structure in the interior of a bear's nose. In four niches various aspects of bears are exhibited by different techniques:

1. A futuristic hologram displays the three sensory systems: smelling, seeing and hearing. The comparison between the sensory systems of bear and man is intriguing.
2. In the second niche, illustrations by the cartoonist Carlo Schneider show some popular misapprehensions about bears. The plates can be lifted and underlying photographs explain and correct these misapprehensions.
3. In two turning columns, different aspects during the development and the seasonal cycles in the life of bears and men are compared.
4. Children can slip into an enchanting cave, which imitates the winter cave of a bear. There, they can listen to the fairy tale "Three Bears" by Leo Tolstoi in Russian or German (Photograph 2).

The core of the building is the Russian dome, where films and slide shows introduce the visitors to the home and origin of Misha and Masha; the first film pictures the landscape in the far east of Russia close to the Chinese border, called Primorje. The second film shows the breeding station located in Primorje where orphaned bears are raised to be reintroduced to the wild. Three slide shows in digital frames tell the history of Misha and Masha and display why young bears in that area are often orphaned.

Bears Nearby

Visitors directly encounter the live bears in the large hall of the building where one can observe the bears up close through big glass panels. A gap in the glass panels also enables smelling and hearing the bears (Photograph 3). We abstained from any educational activity or exhibition in this hall to make the experience of the encounter pure without any distraction. The huge glass panels border the big water pool of the enclosure. Especially in summer it is likely to observe a bear swimming in the pool right up to ones nose (Photograph 4).

Bears Tracks

Leaving the “Bärenhaus” one can follow tracks, which bears leave in the wilderness. Along a trail leading from the house to the forest arena visitors can discover various traces pointing to the presence of bears: One can find a day bed, leftover prey, turned over stones, scratch marks and more.

Simple plates with photographs point to the traces without any explanation texts. Visitors are encouraged to find the traces and make their own thoughts about them. Questions can also be addressed to the caregivers and rangers.

Arriving at the forest arena the visitors can enjoy the bears once more real close through two glass panels. Here they can almost forget where they are but envisioning themselves in the deep forest of Primorje.



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Measuring Behavioural Change in Bangladesh

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Abstract

Behavioural change via environmental education is a fundamental cornerstone of conservation (Jacobson and McDuff, 1998) as the majority of environmental threats are the result of human activities. Changes in human behaviour can be challenging to accurately capture and measure. Using a case study from Bangladesh, we share an example of one way that behavioural change (reduction in littering) was successfully measured as part of a larger hoolock gibbon focused conservation education program.

Introduction

Education plays an essential role in conservation projects by supplying individuals with the knowledge, skills, attitudes, and motivations necessary to take action towards protecting and preserving the natural environment (UNESCO, 1977). Species that are experiencing population decline are most often doing so because of human actions (Newhouse, 1990). Shifting human behaviours towards being more environmentally friendly is a major conservation education objective. Capturing and measuring behavioural change independently of highly subjective self-assessment techniques can be difficult due to the inherent dynamic nature of human beings and the limited availability of proven measuring techniques (Sterling et al., 2007).

A perceived lack of established and appropriate behavioural-change measuring techniques is a common critique of the field of conservation education (Saunders, 2003). Having the capacity to effectively measure conservation education programs' ability to achieve behavioural change therefore is vital not only for individual programs to demonstrate their success, but also for the field of conservation education more generally.

The Wildlife Trust of Bangladesh (WTB), a prominent non-government, non-profit conservation organization in Dhaka, Bangladesh, created the Save Hoolock Gibbons, Protect Forests, Conserve Biodiversity program in 2005. The intention of this program is to foster knowledge, attitudes, and behaviours among local school children that support and perpetuate hoolock gibbon (*Hoolock hoolock*) conservation efforts in the area.

Many conservation organizations in the region suggest that ecotourism is a viable option to generate resources, protection, and land for hoolock gibbons. These organizations presume however that the forests of Bangladesh are typically too littered and unclean for foreign tourists to visit and enjoy at a rate that would support a viable eco-tourism industry. Therefore reduction of littering among participants and surrounding communities is one focal behavioral action change that the WTB attempts to elicit. We found that the intervention created significant and marked increases in proper trash disposal across rural, suburban, and urban children and that our assessment tool to capture this behavioural change worked well.

Because many environmental education programs aim to increase proper disposal of trash and to measure and report this effect sufficiently, this approach could be generalizable to similar programs at other sites. Here we share the program's approach to eliciting this change, the methods that were used to assess success in achieving this behavioural change, and subsequent results.

Methods

The Wildlife Trust of Bangladesh implements the Save Hoolock Gibbons, Protect Forests, Conserve Biodiversity program at rural, suburban, and urban sites throughout Bangladesh. We generated a broad list of potential schools that mirror those typically served by WTB (Greig and Taylor, 1999) that was narrowed from 30 down to 10, as school officials declined or accepted participation.



Potential candidates were then limited further to include only those schools that were funded by the Bangladeshi government. This was done in attempt to eliminate variability in school and education quality.

Urban, suburban, and rural community type classifications were made for each school based on local population density and their distance from Dhaka city, the capital of Bangladesh. During our implementation and evaluation period, June – August 2008, a total of 291 children from five schools participated in our program. These five schools were characterized by community type and then classes from each school were assigned to either the treatment or control condition. Three classes were included in the control condition (N = 112) and four were in the treatment condition (N = 179). Of the students that participated, 166 were male (57%) and 125 (43%) were female.

A pre / post study design with treatment and control groups was used to implement and evaluate this program (Oppenheim, 1992). Treatment groups were administered questionnaires (and given a piece of candy) before and after participating in the Save Hoolock Gibbons, Protect Forests, Conserve Biodiversity program.



Control groups did not participate in program activities, but were also administered the questionnaires (and a piece of wrapped candy) in a time frame and fashion consistent with their corresponding treatment group. Post assessment questionnaires on average were delivered within two days after the pre-assessment questionnaires.

Program activities were administered during regular school hours in classrooms, auditoriums, and/or school courtyards depending on the number of students and facility availability. Head teachers and other members of staff from each school were not present during implementation or evaluation to minimize stress in students and to ensure that teachers did not communicate program related information to students between questionnaire sessions (Oppenheim, 1992).

The 'proper disposal of trash' activity included in the Save Hoolock Gibbons, Protect Forests, Conserve Biodiversity program was straightforward. We

introduced the concept of littering versus proper disposal of trash to participants in the treatment condition and then discussed the potential consequences of litter on humans, animals, and potential income streams like ecotourism. A trash clean-up activity in the surrounding area followed.

School Name	Community Type	Condition	Num. Participants
Bhanugach Primary	Rural	Control	19
Dolochara	Rural	Treatment	31
Tetuljhora	Suburban	Control	22
Tetuljhora	Suburban	Treatment	37
Bin Shreshtha Noor Mohammad Rifles	Urban	Control	71
Bin Shreshtha Noor Mohammad Rifles	Urban	Treatment	60
Manarat International	Urban	Treatment	51
Total			291

Table 1. School community type and treatment condition classification

Trashcans were placed in fixed positions at all sites, for both the treatment and control conditions, for the duration of program implementation and evaluation. These fixed positions were approximately 9-10 metres away from the place where students sat to take their pre/post tests. All students were given a wrapped piece of hard candy while filling out their pre/post questionnaires. The number of wrappers that were placed in trashcans versus improperly disposed of wrappers (i.e. thrown onto the school yard, classroom, or forest floor) was recorded.

To ensure implementation consistency, the same members of the WTB administered program activities in Bangla each time. The lead researcher (CML) was present during all sessions for methodological clarification and to ensure consistency across groups and sites. During evaluation sessions, WTB team members did not indicate desired responses or behaviours to reduce the chance of social desirability bias (Oppenheim, 1992; Fisher, 1993).

Statistical analyses were conducted at the group level with Friedman non-parametric repeated measures tests across community type with pre / post candy wrapper counts for control and treatment groups as the predictor variable using the SPSS statistical package (version 10, IBM Corporation, Armonk, New York).

Results:

The number of proper disposals of candy wrappers non-significantly increased (Friedman $X^2 = 3.0$, $p = 0.08$) in treatment groups post program implementation, while proper disposal counts were virtually the same (Friedman $X^2 = 0.02$, $p = 0.93$) during pre- and post-assessments with control groups. This trend existed across all three community types (Table 2).

The highest proper wrapper disposal rates observed during pre-assessments were in the urban areas (93.8%, $N = 182$), with lower overall average rates existing in the rural (63.2%, $N = 50$) and suburban (82.4%, $N = 59$) communities.

The non-significant increases in proper wrapper disposal between pre- and post-assessments in the treatment groups were present across all three community types (Figure 1). Note that none of the community types within the control groups increased their rates of proper wrapper disposal.

The greatest increases in proper wrapper disposal

were in the rural and suburban community types with an average increase of 13.2%. Although the urban groups had approximately half the increase in proper wrapper disposal, they also had a markedly greater initial rate (91.9%).

Discussion:

The environmental education program seems to have had an impact on the behavioural tendency of our participants to properly dispose of candy wrappers after program participation, even if that impact was marginally not statistically significant. Little to no change in proper disposal rates was seen by classes that participated as control groups and did not engage in Save Hoolock Gibbons, Protect Forests, Conserve Biodiversity program activities.

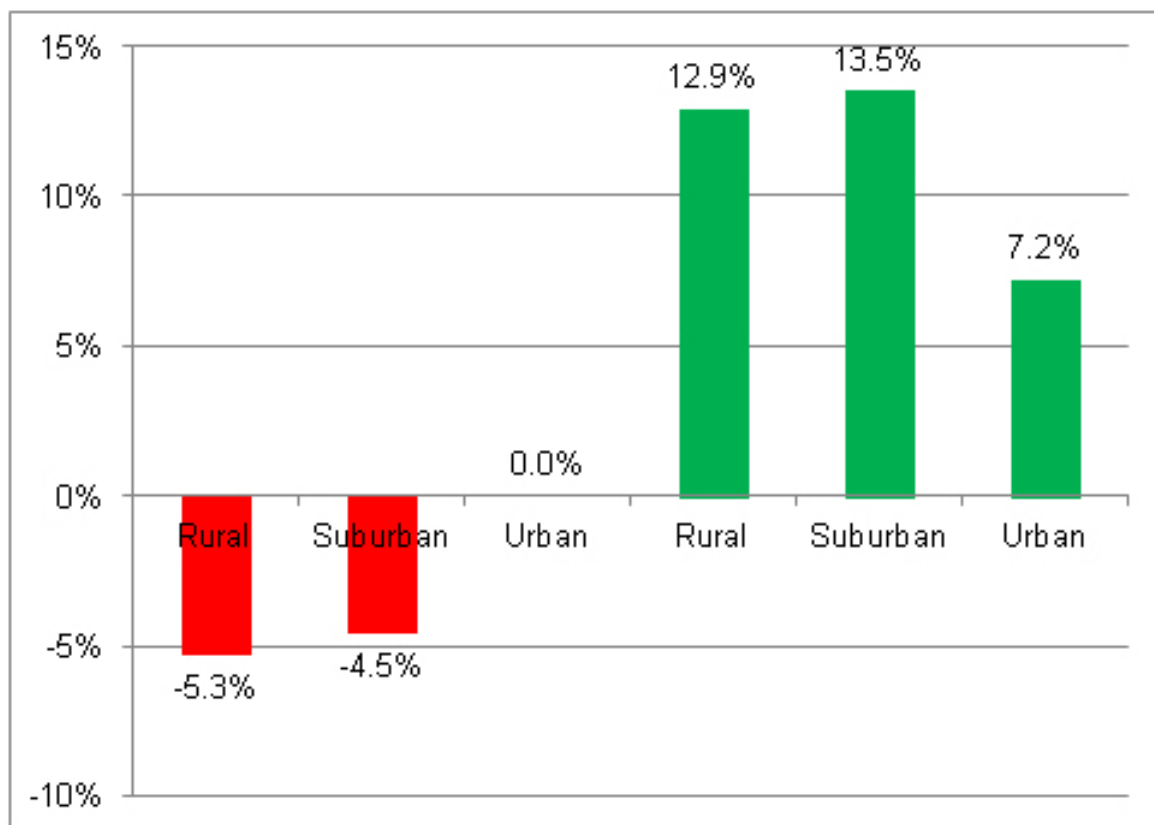
The opportunity to improve proper trash disposal seems to be greatest among rural and suburban children, given that their average rates of wrapper disposal were much less than the urban children in our pre-assessment. The gains were almost double that seen in the urban children. This is likely due to the fact that the overwhelming majority (91.9%) properly disposed of their wrappers during the pre-assessment, they numerically could not have improved by the average increase seen in the other two types of communities (13.2%). Rural and suburban children engaged in proper disposal at much lower rates during pre-assessment (63.2% and 82.4%, respectively). As a consequence, the opportunity to increase proper disposal was much greater in the non-urban communities.

This behavioural modification could enhance conservation efforts for hoolock gibbons by increasing the likelihood of a viable ecotourism industry since tourists are less likely to visit areas with rampant litter problems. This in turn could increase revenue that could be used by local authorities and conservation groups to build local capacity, implement more education programs, and popularize the plight of hoolock gibbons further.

Many conservation education programs include proper trash disposal as one of their main objectives. In addition, many also use pre / post study designs with treatment and control groups. As such, the assessment approach that we describe herein should be easily replicable by other programs.

	Control (N = 112)			Treatment (N = 179)		
	Rural	Suburban	Urban	Rural	Suburban	Urban
N	19	22	71	31	37	111
Pre-Intervention (N)	13	19	68	18	29	102
Post-Intervention (N)	12	18	68	22	34	110

Figure 1. Average percent difference in wrapper disposal during post assessment for control and treatment groups. Red bars represent control group differences and green bars represent treatment group differences.



In addition to the basic importance of improving the well-being of people and wildlife derived from trash disposal interventions, the value of assessment to demonstrate impact is crucial for garnering funding from donors and in reporting progress.

We do acknowledge some limitations to our findings, including our ability to generalize disposal of a single candy wrapper to other trash types that are larger or more difficult to process (e.g., tires, construction debris, etc.). Another potential limitation of our study is duration of time between assessments. We would have liked to replicate the wrapper disposal test again several weeks, months, and/or years later. This would help us determine whether or not the trend of more people properly disposing of candy wrappers in trash cans would continue over time.

Nonetheless, a systematic approach to measuring behavioral change such as this can potentially add great value to conservation education programs, especially those with a proper trash disposal objective. This behavioral-change measuring technique not only assisted us in accurately gauging the success of our interventions, but also quantified a shift in behavior in a very tangible way. This is something that has been called forth by friends and critics of this field. Lastly, this assessment approach is simple, inexpensive, and low tech, increasing its attractiveness and usability potential even further.

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Using online media to connect students with field conservationists

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Abstract

"I'm a conservationist" was a learning experience which aimed to engage keystone three students with wildlife conservation by allowing them to interact directly with field conservationists online. This was done through blogs and Skype conversations for a week before the students voted for their favourite conservationists to win £500 for their species. The students completed questionnaires before and after the project. Analysis by chi-square tests revealed significant differences in the students' knowledge of where Durrell has field projects and also in their level of concern for the study species.



Online footage from the Madagascar team

Introduction

There is a growing trend to utilise online media and new technology to enhance learning about wildlife and conservation (e.g. Hammond 2012, Smith et al. 2011). BIAZA, EAZA and WAZA encourage their members to use a variety of media including those online to engage their visitors and to use internet technologies for specific educational purposes (BIAZA 2009, EAZA 2008, WAZA 2005) and it is the challenge for educators to discover new ways to use technology and reorganise our teaching to offer students new learning opportunities afforded by these technologies (Brewer 2003).

These technologies are becoming increasingly familiar to visitors and can offer insights into elements of our conservation work that would not normally be accessible to the average visitor e.g. using video-footage and digital photos on screens and websites to explain what happens behind the scenes or on field projects.

With 45 projects in 14 countries around the world, Durrell faces a challenge to engage people with its field projects, particularly those in-situ projects where there are no animals on-show for the wildlife park visitors to see. This issue was highlighted at the public participation meetings, part of the EUZOOS-XXI project, when participants encouraged Durrell to find ways of enabling people to see behind the scenes and how that work connects with their conservation in the wild (EUZOOS-XXI, 2011).

In the UK, feedback from teachers who took part in “I’m a scientist, get me out of here!” described how the students enjoyed a learning experience that engaged all pupils irrespective of ability and background (Pontin 2011). The online project, run by GalloManor, allows students to converse with scientists to learn more about what they do. This inspired the education team to develop “I’m a conservationist” where students in Jersey were given the opportunity to learn about Durrell’s conservation work directly from the people doing it wherever they were in the world. The project used a combination of blogs and Skype to give the students direct contact with the conservationists in their respective countries and was supported by additional campaign activities in science lessons to promote the cause of their favourite.

Method

The project ran from Tuesday 19th March – Wednesday 27th March 2013 and more than 100 year eight (age 12-13) students from Grainville School in Jersey participated. The aim of the project was to allow the students to engage directly with members of the field project teams to learn more about the species they are conserving and the daily activities they undertake. Through evaluation we hoped to demonstrate that this engagement can have a significant impact on the students’ understanding and their attitude towards endangered species.

The project had a competitive element as there was a £500 prize to be awarded at the end of the week to the conservationist who the students voted as the winner. This form of competition has become very familiar in recent years through popular television shows such as I’m a Celebrity, X-Factor, Britain’s Got Talent, etc.

Before the project began, the students completed a questionnaire to assess their existing knowledge and attitudes. This was repeated after the project to see if there had been a change in their understanding and level of concern along with some additional questions to find out what the students thought of the project.

The students’ understanding of where Durrell staff work and what they do was assessed through open questions and their attitude towards each species was assessed with a 5-point Likert-type scale running from Not At All Concerned to Very Concerned. As well as the four study species, we included three additional species: meerkats - a popular but non-threatened species kept at the wildlife park, orange-tailed skink - a threatened species kept off-show and supported in the field by Durrell and Sumatran tiger - a threatened species Durrell is not involved with.

At the launch, a member of the education team outlined the project and announced the four conservationists and their species.

Name: **Francesca Cunninghame**
 Location: Galapagos
 Species: Mangrove finch
 Red List Status: Critically Endangered



Name: **Lloyd Martin**
 Location: Montserrat, Caribbean
 Species: Mountain chicken
 Red List Status: Critically Endangered



The Durrell field conservationists and their species

Name: **Lance Woolaver**
 Location: Madagascar
 Species: Ploughshare tortoise
 Red List Status: Critically Endangered



Name: **Elizabeth Corry**
 Location: Jersey
 Species: Red-billed chough
 Red List Status: Least Concern (Locally Extinct, part of a reintroduction project)



I'm a conservationist, get me out of here!



Name: Lloyd
Location: Montserrat, Caribbean
Species: Mountain chicken frog
Status: Critically Endangered
[View blog](#)



Name: Liz
Location: Jersey
Species: Red-billed chough
Status: Locally Extinct
[View blog](#)



Name: Lance
Location: Madagascar
Species: Ploughshare tortoise
Status: Critically Endangered
[View blog](#)



Name: Francesca
Location: Galapagos, Ecuador
Species: Mangrove finch
Status: Critically Endangered
[View blog](#)

In their science groups, students developed questions they could ask each of the conservationists.

The students' homework for the week was to go online, read the blogs and ask their questions. The conservationists tried to add a daily entry of their activities for the students to read. This included photos and links to video-footage for the students to see as well.

In a joint science lesson, the students were able to speak to the conservationists directly through Skype, broadcast on the big screen and with key students designated to ask the questions from their science group.

Other science lessons were devoted to students making campaign posters and giving presentations to each other about their favourite. The students then cast their vote anonymously for the conservationist they thought should win £500 for their species.

The votes were counted overnight and the winner was announced the following day in a special assembly. The students voted Lance and the ploughshare tortoise as the winner and we contacted Lance through Skype to congratulate him and found out that he would use the money to buy transmitters for radio-tracking the tortoises in the wild.

The school also awarded prizes to the students who had participated most in the project.

Results of the student vote

Lance and the ploughshare tortoise	59
Lloyd and the mountain chicken	21
Francesca and the mangrove finch	13
Liz and the red-billed chough	10

Results

During the project, the blogs received more than 2000 views in total from Jersey, some will have been teachers and Durrell staff involved with the project.



Blog views and comments

Blog	Page views	Comments
Lance and the ploughshare tortoise	835	43
Lloyd and the mountain chicken	599	29
Francesca and the mangrove finch	493	19
Liz and the red-billed chough	602	32

We received 90 completed surveys from the teachers and used Excel and chi-square tests to look for significant differences between the pre-project and post-project data.

In the pre-project survey, when asked to name places where Durrell has field projects, more than 50% of the students were unable to correctly name any locations but after the project 75% could name at least two of the locations and 50% of the students were able to correctly name all four of the field project locations. A chi-square test gave a significant result ($\chi^2 = 46.81$, 4 degrees of freedom, $p < 0.0001$).

Students were asked what sort of activities Durrell's field staff undertake. Similar answers were grouped into categories for analysis. Certain technical phrases, such as tagging and breeding, only occurred in the post-project answers, however analysis by chi-square test did not reveal a significant difference ($\chi^2 = 14.16$, 8 degrees of freedom, $p = 0.078$).

The students were also asked how concerned they were about the different species. A chi-square test showed significant results for the four study species but did not show significant change for the control species.

After the project, the students were asked what they had enjoyed most about the project, 53% mentioned skyping the conservationists, 29% mentioned making the poster and campaign activities, 11% cited the blog, 8% the actual voting and 18% other responses including "All of it" and "learning about the animals".

Discussion

Country of origin is included on all the species enclosure labels at the wildlife park, additionally those locations where we are working in the field are reinforced with further signage and talks.

More than 75% of the students had visited the park within the last year yet most of the students were unable to name where Durrell had field projects before the project. The project provided significant reinforcement of the different locations: through the students' research and campaign activities, discussing the time difference and weather directly with the conservationists over Skype and each time they visited the blog link page. By offering information in a variety of formats, we provide reinforcement of key ideas but also offer alternative opportunities for people with different learning styles to engage with the information. Unfortunately the

evaluation does not provide scope to assess whether one format was more successful than the others.

When analysing the students' responses regarding the activities undertaken by field staff, direct comparison of a student's pre- and post-results revealed 38% showing a positive change through increased use of technical terms (such as tagging, breeding, etc) and fuller or correct answers compared with their pre-project response. However, there was less reinforcement of the field staff's activities built into the project as this was only covered through the blogs (which some students admitted not visiting for their homework) and the Skype conversations, also the question itself was very broad, all of which may have contributed to the less significant change in students' knowledge.

Another goal was to assess whether the project had an impact on students' concern for species. It was apparent from the pre-project results that students were already aware of the plight of charismatic species through other sources as they were most concerned about the Sumatran tiger which Durrell does not work with. A number of students had not heard of some of the study species before the project (particularly red-billed chough and mangrove finch). However learning about the species from such passionate champions, as Lance, Liz, Lloyd and Francesca, changed their attitude and results show that there was a significant increase in the student's level of concern for the study species after the project compared with before. This suggests that there is a link between knowledge/awareness of a species and the level of concern an individual will feel for that species.

The value of including a variety of activities to engage diverse learning styles was highlighted by all the elements being mentioned by the students as the most enjoyable. 53% mentioned Skype which may have been due to the novelty of communicating directly with field conservationists working in such unusual parts of the world. (They also enjoyed seeing themselves on the big screen through the webcam!)

The teachers were able to adjust the campaign activities for different ability groups and the homework gave enthusiastic students the opportunity to engage more with the conservationists through the blogs. When asked which blog was their favourite, Lance was most popular but the pattern of answers did not match the voting results for the others suggesting that other factors, perhaps the charisma of the animal, also influenced students' decision over who should win. We did not include a mammal as we thought cute and fluffy might sway the voters. We hope to include

one next year and it will be interesting to try to assess whether the charisma of the species has a greater or lesser influence than the charisma of the field conservationist.

Voting for a winner and empowering the students to make a decision that would have a genuine impact on a field conservation project seems to not only have provided an engaging hook for the project but also caused the students to think deeply about choosing the winner. Student feedback included: "When I got to vote we had to think carefully and £500 could depend on me" and "The choosing for votes I enjoyed the least because it was very difficult between the mountain chicken and ploughshare tortoise".

Conclusion

Blogs and Skype provide education practitioners with opportunities to link our audiences directly with activities taking place in the field. They provide an exciting and engaging learning experience that can significantly influence the level of concern for a species as well as extending a student's understanding. Feedback from the school, both pupils and teachers, as well as from the conservationists themselves has been very positive and we hope to run an expanded version of "I'm a Conservationist" again in the future with more participants. One unexpected benefit of the project has been the strengthening of the links between the education staff and the field project staff who, for geographical reasons, do not often get the opportunity to work together.

Acknowledgements

Grateful thanks to NatWest for their sponsorship of the project and particularly to Yveline Sheldon for her assistance with the sessions in school.

Particular thanks to Eluned Price for her advice on statistics, also to Tim Wright and Lianne Concannon for their advice, the education team and Catherine Burrows for supporting the project and extra special thanks to Liz Corry, Lance Woolaver, Francesca Cunninghame, Sarah Louise Adams, Jervaine Greenaway, Lloyd Martin and Andrew Terry for their time and support of the project and also to the science staff and Year eight students at Grainville School.



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Please contact the author if you want to see more of the data and analysis of results that for reasons of space has been edited from this article.

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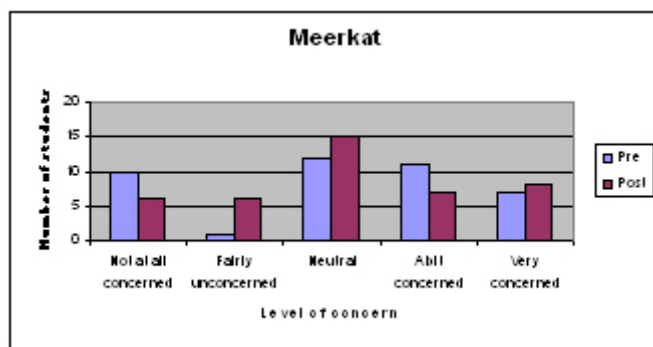
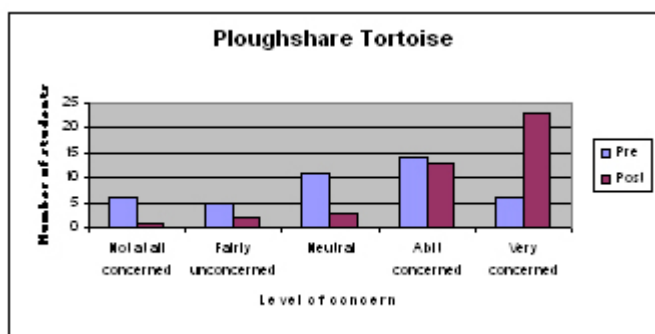


Figure – Illustration of change in students' attitude for two of the species

'Fear' As An Educative Tool

Catalina Rodríguez Álvarez¹ & Paola Gómez Ovalle².

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Animals such as bats, mice, spiders and snakes cause feelings of fear and disgust, but most of the time people don't know that they play important roles in their habitats. At the Zoológico Jaime Duque we take advantage of this situation and decide to use fear as an educative tool.

Materials and methods

A dark tunnel with terrariums was the perfect scenario to show a toad, a snake, crickets, spiders, mealworms and mice. Decoration was also important, and Halloween characters were our inspiration: pumpkins, giant spiders, spider webs, bats, and halogen lights complete the experience (Figure 1).

Figure 1. A dark tunnel with terrariums and decorations Halloween type was the scenario for the terrifying experience. Photo by Zoológico Jaime Duque.



At the entrance we warned people about which animals they were going to see inside the tunnel, to prevent phobic persons to get in. With small groups our education personnel did tours through the exhibition, illuminating each terrarium with a lantern and explaining curious facts about each animal and the important role they play within their ecosystems (Figure 2).



Figure 2. Bugs inspire fear and curiosity, feelings on which we take advantage to educate. Photo by Zoológico Jaime Duque.

To evaluate the activity we chose an easy way to measure attitudinal changes. We implemented a pre-evaluation and post-evaluation. For the pre-evaluation we chose to ask people about bats because 2012 was the "Year of the Bat"; what we did was to give people a piece of paper where they wrote their thoughts about these animals.

For post-evaluation we put a billboard at the end of the tunnel, where people could write now that they had information about these animals, what they thought about them (Figure 3).

Figure 3. All that we needed was a billboard where people could write about his experience. Photo by Zoológico Jaime Duque.

Analysis of the results obtained at the evaluation was made through a technique called Content Analysis. This is a qualitative analysis technique, consisting in categorize the answers based on its explicit and implicit contents and reflecting the purpose of the research; categories are established after a preliminary analysis of the data obtained, because they must represent the principal content areas (Cohen & Manion, 1994; Krippendorff, 2004). What we did was to review the answers identifying common topics among them and with that information we create the categories.

Results

For the pre-evaluation we classified the answers in three categories: Reject (people don't like bats), knowledge (people know some information about bats) and admiration (people like bats). Categories of the post-evaluation were: To take care of the animals, to take care of the environment and about the activity.

Only one person wrote that although these animals give us benefits, they are still disgusting.



Table 1. Categories established based on the answers gave by people to the question: What do you know about bats? as a way to evaluate previous conceptions.

Content category	Results
Reject	Bats are ugly and evil They are dangerous Bats are dirty They are symbols of darkness, fear and Halloween
Knowledge	Bats eat fruits, insects and blood Bats have good hearing Bats live in caves and are nocturnal
Admiration	They are scary Bats feed on blood They transmit diseases Flying mammal Guano is produced by bats
	Fast! Pretty, funny Attractive animal, perfect for science fiction themes I don't like bats because they live in the darkness, but I admire them because they can live under these conditions Fantastic animals

Table 2. Answers gave by people who participate in the activity, sorted by content categories.

Content category	Results
To take care of the animals	My thoughts changed, now I know that every animal is necessary Animals are important and every species plays a key role Animals are also living beings and deserve respect Don't hurt or kill animals, even if they are ugly Bats are ugly but cute Only few bat species eat blood Thank you spiders for the spider webs Hurrah for the bugs!
To take care /environment	We must care nature It is important to recycle in order to prevent plagues like mice
About the activity	I like the experience It was very interesting I like that this is a place where you not only exhibit animals, but beside you educate people.

Discussion

Scary animals such as these that we used provoke fear but also fascination, feelings on which we take advantage to teach people about them and convert them in ambassadors of environmental issues.

Evaluation showed us that people do changed his points of view, and support the idea that sometimes people don't care about the environment because of ignorance. Once more, it was proof that zoos and aquariums represent a great opportunity to increase knowledge and awareness.

Conclusion

We, as zoo educators, can contribute to change the way people approach themselves to wildlife and to caring for the environment, but what is more important is that you don't have to design a complicated activity or spend a large amount of money, our creativity is the only limit.

Acknowledgments

Special thanks to Daisy Salgado and Konstanza Acosta, who implement the activity.

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Living In Harmony With Elephants

Understanding elephant behaviour and their link with Savannah Ecosystems

Vella A. Kwamboka

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Introduction

Children learn best through physical activity and movement. Our elephant training lessons make use of auditory, visual and kinesthetic learning styles to develop children's social, emotional, cognitive and critical thinking skills. This helps develop a passion for science and discovery, a pride in their wildlife heritage, and an instinct to care for the natural world.

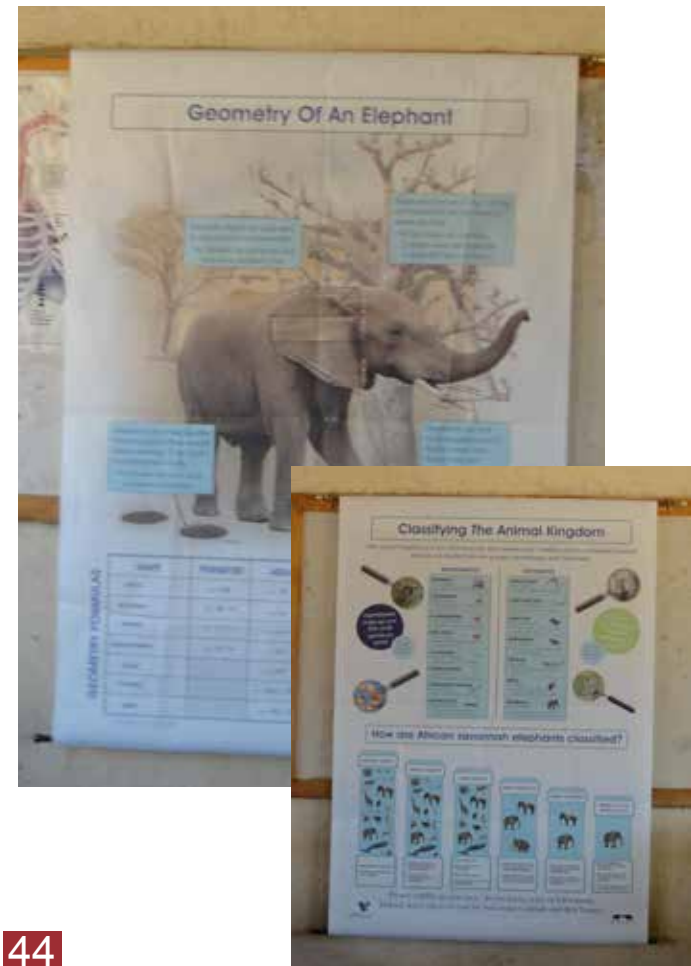
Materials and Methods

(a) Research Baseline

In mid-2011, our Monitoring of Illegal Killing of Elephants (MIKE) program released a report which indicated that the poaching levels in Buffalo Springs and Samburu National Reserves and the Northern Rangeland Trust Community conservancies was much lower compared to the high poaching levels in the unprotected Turkana community rangeland.

(b) Needs Assessment

Based on this report, a Needs Assessment was conducted in primary schools around Samburu National Reserve to find out student knowledge and attitudes towards elephants. The assessment was in form of questionnaires which listed a number of wild animals, elephants included. Students were required to indicate which animals they liked or did not like, and why.



From the results, it was clear that children in the region find elephants to be scary. Positive attitudes towards certain animals tended to occur when they were useful as a resource (food), beautiful, or harmless. There was a mixed reaction when it came to elephants. Children who liked elephants were because they boost tourism, and their ivory is valuable. Those who disliked them were because they are viewed as a danger to humans, crops and villages. It was clear that we needed to shift children's perceptions and attitudes of elephants to "admirable" animals by sharing the elephants' amazing adaptations and contributions to the ecosystem as a positive way to balance their negative impacts. The Needs Assessment was carried out by non-STE staff to discourage students from giving biased information.

(c) Designing Elephant Lessons

With this in mind, STE and Disney Animal Kingdom educators and scientists partnered to come up with a structured curriculum specially designed for primary schools located in areas hard-hit by elephant poaching. The new tutorial titled 'Living in Harmony with Elephants' has four sections: Discover African Elephants; Save the Savannah; Protecting Elephants' Future and Ours; and Observing Elephants and the Savannah. The lessons make use of pre/post/post-post evaluations, photos, video clips, films, visual aids, posters and both indoor and outdoor physical exercises. The first three lessons were presented to students at their various schools, and to connect them with nature, students were taken for a game drive into Samburu National Reserve where they were expected to observe elephants' behavior, and how elephants and other wildlife relate to their immediate environment.

The elephant lessons are targeted at class 6, 7 and 8 students and its objectives are to;

- i. Create positive student attitudes towards elephants
- ii. Increase students' knowledge about elephant behavior, habitats, and its conservation challenges
- iii. Encourage human-elephant conflict mitigation actions
- iv. Provide behaviors that will help students live more safely around elephants.

Results

Before and after the lessons were presented, evaluations were carried out to assess changes in student knowledge, attitudes and behaviour. Both evaluations had ten similar questions and an open-minded homework assignment where students were asked to write a story about an actual encounter they had with elephants. From the analysis of the different emotions conveyed about these encounters, it was evident that the children feared elephants.



The evaluation results showed tremendous improvement in student knowledge and perception of elephants, as more students began to comprehend why elephants behave the way they do, the extent to which they are similar to humans, and the significance of their continued existence, thanks to our lessons. For instance, when children were asked if they dislike or disliked elephants, the average answer moved from 'like' to 'strongly like'. Also, half of the students could site ways elephants are beneficial to the health of the savannah. This success may be attributed to the use of fun, inspirational, empowering and participatory learning techniques.

Discussion

The interactive setting created is a stimulating change for the children, pulling them out of the rigmarole of normal lessons which confine them within classroom walls, into a captivating environment that allows them to see and experience nature and all it has to offer. The tutorial is geared at improving students' knowledge and attitude towards elephants, drawing on children's inherent desire to take care of the world around them. All the four modules have already been presented to standard 8 students in the target Turkana schools. These lessons will be presented to each year's new standard eight students in these schools.

Conclusion

Conservation is about choices that people make most of which impact on biodiversity. Biodiversity conservation therefore is less about biology and more about behaviour. One way of making conservation a

human endeavour is by educating communities. To effectively change people's behaviour, when raising awareness, motivational elements are included and vary between self interest, social responsibility and self transcendent values.

The baseline data collected on student attitudinal changes over time will be used to influence Northern Rangelands Trust, local government and Kenya Wildlife Service into converting the Turkana area, which is one of the hard-hit elephant poaching area, into a community conservancy, where the Turkana community will take responsibility for and benefit from wildlife conservation.

Acknowledgements

Save the Elephants appreciates the continued support by Disney Animal Kingdom, who provided financial resources and learning materials required for the successful implementation of this initiative. We are also very grateful to the headmasters of the local primary schools in Samburu for permitting us to often visit and present these lessons to students.

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Collaborators and funder: Disney Animal Kingdom

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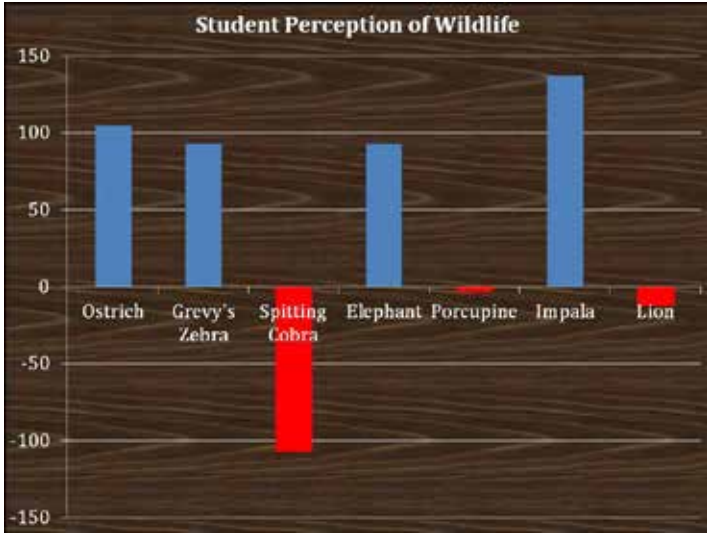
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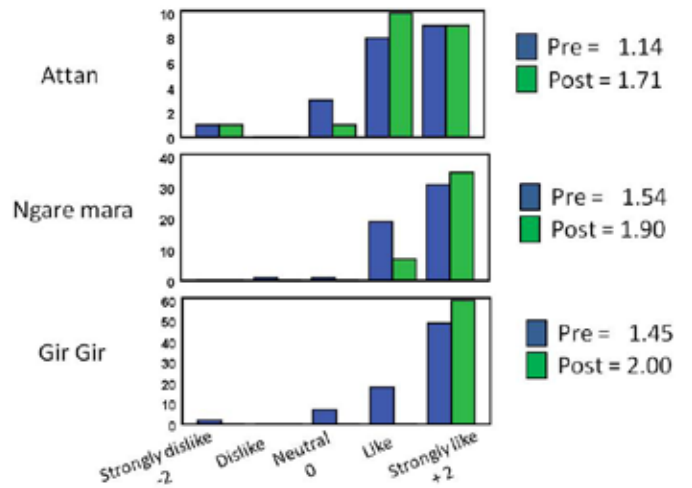
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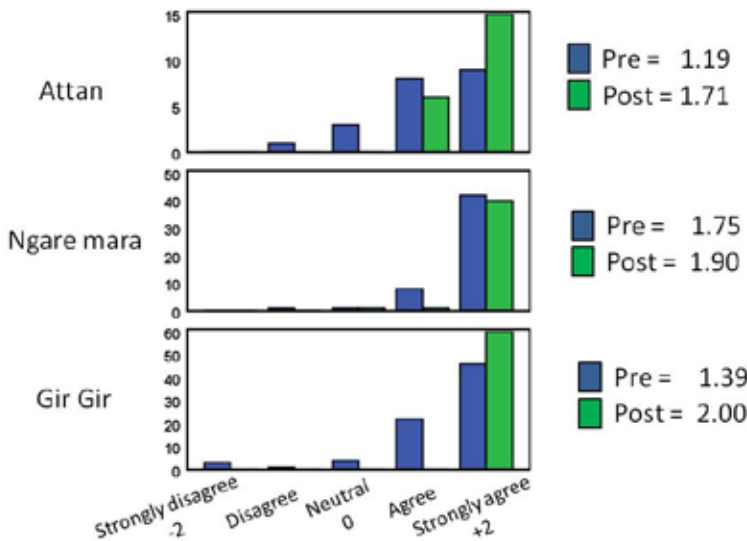
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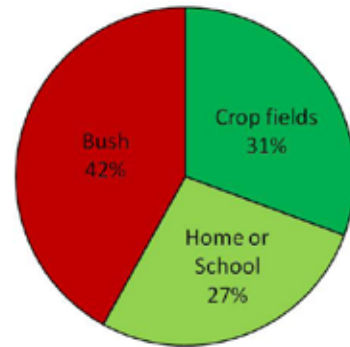
Q1: How do you feel about elephants?



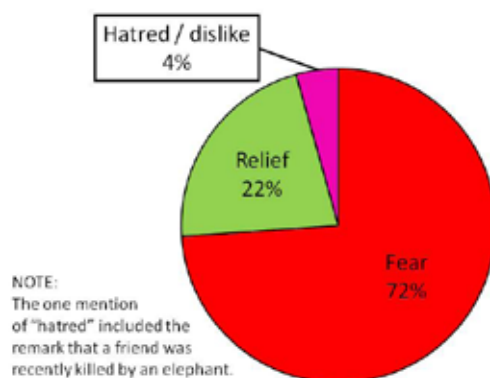
Q6: Elephants should be respected.



Homework: Write story about an elephant encounter encounter location



Homework: Write story about an elephant encounter emotions mentioned



Our Zoo, Our Community - A successful community zoo partnership.

Claire Doyle, Educator, Dublin Zoo, Ireland.

The after school programme run by Dublin Zoo's Education Department provides young people from an inner city background with opportunities to have specialist zoo experiences. This is achieved through innovative and groundbreaking collaboration between inner city youth services and Dublin Zoo. The programme will encourage young people to become advocates of nature - influencing members of their community to learn about nature, conservation and science. We wish to create and maintain a successful zoo/youth service partnership, which will create rich and rewarding learning resources to entice young people and their youth workers. This project supports youth workers to deliver something unique to a disadvantaged group with best practice teaching and learning through student led investigations in behind the scenes areas - challenging deeper levels of thinking and connecting learning to the community.

The programme 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 programme design utilises the latest best practice teaching innovations such as 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 situation. Students respond 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 J. 2000). It caters for all abilities, talents and learning styles of students.

The goal is to help children make sense of the world in which they live and to see the relevance of nature. The zoo visit will enable children to combine images from television, video and books with real life observations. The aim is to help young people from disadvantaged backgrounds to make the connection with nature and to make informed choices about the world they live in now and in the future.

Background:

Dublin Zoo Education Department has developed a working relationship with inner city youth groups over the last number of years. Since 2006 we have built on the existing after school programme and have now fully integrated the programme into the Education Department's calendar.

We have also built a valuable link for these young people among the keepers and education staff of Dublin Zoo.

The young people involved showed a great deal of interest in animals and the natural world to their youth workers. The groups involved were handpicked based on behaviour and aptitude as well as their creativity – many groups carried out a piece of artistic work as a way of expressing what they learned on their visits to the zoo. Group Profile:

10 -13 yr old mixed groups. Most live in a flat complex in the inner city. Many are at risk of early school leaving.





Main Aims of the After School Programme:

- To build an educational model with a strong focus on practical learning: a hands-on approach specifically aimed at youths from disadvantaged areas.
- To learn about zoo keeping, animals and the natural environment.
- To develop skills and relationships within the group and with staff. A huge part of this programme was the social interaction gained outside their own community – meeting & working with people in a new setting.
- To use elements of creativity throughout the process, culminating in an piece of work.

Outcomes:

- Creativity and skills based learning.
- A positive joint piece of work with an established organisation.
- The positive experience of working with young people outside of their normal everyday environment
- Provided participating youths with knowledge and skills and confidence that would enable them to develop their own independent ideas and initiatives.
- The young people benefited in that their engagement with nature was enhanced. They experienced innovative, enquiry-based lessons through behind the scenes activities.
- Youth workers and young people became engaged in real life and meaningful learning experiences, as well as allowing them to take ownership of their learning – This is the challenge of implementing new science education programmes at the zoo. Youth workers were encouraged to integrate zoo learning back into the traditional learning areas. An equal challenge from a zoo perspective is how we engage students in our work so that a zoo visit is not merely seen as a fun day out but an important and relevant learning experience, supporting vision and mission.

2010 After School Programme Timetable:

Dublin Zoo Education Department offered the After School Programme to three Youth Services in the inner city in 2010: Ballybough Community Youth & Sports Centre; Donore Avenue Youth Service;

and Ringsend & Irishtown Youth Project, Ringsend & Irishtown Community Centre.

The programmes ran seasonally in spring and autumn from 3.30pm to 5pm on a Wednesday or a Friday afternoon depending on the group involved. The **timetable** ran as follows:

- 3.30pm Meet at front gate. Welcome & discussion on the theme of the days programme. Safety briefing for relevant animal area
- 3.45pm Animal encounter - Behind the scenes tour or enrichment workshop
- 4.25pm Guided portion by education team member through the animal enclosure from the visitor side
- 4.45pm Recap the days task – what have we learned about the animal in its natural habitat & in the zoo environment
- 5.00pm Programme finish.

On completion of the 6 week programme the young people involved are given a Dublin Zoo certificate of completion and an education pack. Education staff also host a small 'party' to celebrate the young people's achievements throughout the programme in the last session.

Animal team Involvement:

Cross departmental collaboration has made this programme a huge success. The three team leaders provided fantastic support and commitment to the programme as well as making keepers available to offer behind the scenes encounters as part of the programme. The 2010 programme was the first where animal encounters were offered weekly for the duration of the programme. Strict behind the scenes safety procedures were adhered to. The young people were given a safety briefing on arrival. The behind the scenes portion of the programme was about 30 - 40 minutes in duration.

Conclusion

Creating and maintaining this programme started with gaining the support of the whole zoo. The commitment of various departments across the zoo was essential for the success of this programme. The next crucial element was finding youth workers committed to creating student engagement. By ensuring ongoing engagement, communities are empowered in their belief and ability to make a difference. If continuously supported these partnerships can offer rich, authentic experiences that have a genuine impact on deeper learning and changes in beliefs and attitudes, which could further enhance community action beyond the classroom. A community zoo partnership can achieve ongoing engagement and provide support in disadvantaged areas to mobilise the young people involved to join us in creating a future where humans are more in balance with nature.

Delivering Conservation Education in a Zoo Based Conservation Organisation

Donna Livermore, Learning Engagement Manager, Zoos Victoria

At Zoos Victoria in Australia we are clear that we exist to fight extinction, “to galvanise communities to commit to the conservation of wildlife and wild places by connecting people and wildlife”. We aim to achieve this in two ways: by increasing the population size of endangered animals through breeding and research; and decreasing human threats by influencing visitors, including students to take up sustainable behaviours to help wildlife.

Students are a key audience at Zoos Victoria. Across our three properties in Victoria: Melbourne Zoo, Healesville Sanctuary and Werribee Open Range Zoo, 150,000 students per year visit us onsite. Many more access our websites. Together with our overarching aim to influence behaviour change, the Zoos Victoria’s schools education department is also striving to help students develop the skills, knowledge and attitudes to operate effectively and thrive as citizens of the 21st century. We also aim to develop, nurture and mentor young conservation leaders and lead change in teaching and learning practice and sustainability in schools.

It has become clear that we require a paradigm shift in education delivery that requires a multi-faceted approach and a change in pedagogy.

The focus of this paper is to examine how we currently deliver school education, why there is a need to change and to discuss the results of initial research performed by tertiary students from the Worcester Polytechnic Institute, USA, and focuses on students aged 10 to 14 years old (middle years of schooling).

Current Delivery Models for Learning

There are two main delivery models at Melbourne Zoo: educator led sessions (generally 45 mins) or self-guided sessions. The session usually takes place in a ‘classroom’ like setting with the rest of the visit to the zoo being self-guided. The other option is a completely self-guided experience without any formal interaction with a zoo educator or other staff member.

Changing Delivery Models for the Middle Years of Schooling

The delivery of education, particularly at Melbourne Zoo, has been much the same since its inception over 40 years ago. While visiting teachers are generally very satisfied with their zoo visit we can identify many gaps and challenges with the current delivery models. One of the missed opportunities is the approximately 50,000 students that visit the Zoo on self-guided excursions do not formally interact with zoo staff. What are they learning? Do they leave the zoo aware of conservation

messages and do they make behavior changes to help save wildlife following their visit? One of the main aims of the new delivery model is to ensure that all visiting students and teachers learn about our conservation efforts and the ways they can take action to help save wildlife.

The new model also aims to deliver:

Learning outcomes across the curriculum

Rich learning at a deep level

Activities that encourage the development and practice of 21st Century skills such as problem-solving, critical thinking and collaboration

An approach that utilises the latest thinking in teaching and learning

The flexibility to accommodate different learning focuses depending on teacher, student and curriculum needs.

The new model will focus on the whole day experience and utilise the entire zoo as a learning space rather than restricting learning to a 45 minute classroom experience. This change in delivery should ensure that

learning at the zoo feels less ‘school like’ and very different to what students expect learning to be. Students will be given more choice in their learning as they will be aware of the outcomes required but have ownership over the pathway they take to achieve those outcomes, allowing and encouraging self-directed exploration.

The new model for education delivery was recently trialled at Melbourne Zoo and research conducted allowed us to compare the outcomes to the two existing delivery models.

The new delivery model trialled included:

Meet and greet all students as they enter the zoo. (15 minutes). 1. Set the scene to visit key ambassador species for conservation action; 2. Outline structure of the day including where to meet for the workshop; 3. Outline outcomes and how to demonstrate that they have been



achieved; 4. Distribute the map with key species to visit highlighted, with a focus / challenge question for the day and other learning resources; 5. Ability to meet with over 100 students at a time

Students Workshop (20 minutes) 1. Students can ask questions and clarify knowledge; 2. Educator can challenge students to explore a topic more deeply and at their level; 3. Creates a connection to educator.

Teacher Workshop (20 minutes) 1. Teachers can ask questions and clarify knowledge in small groups; 2. Discussion about how to use the zoo services to extend the learning at school; 3. Short professional development session to address the skills, knowledge and attitudes of teachers

Recap of the day, pledge to take action and farewell (15 minutes) 1. Educator can get feedback from students (summative assessment); 2. Get students to upload a photo / question / comment to Act Wild (embedded evaluation); 3. Ask students to pledge to take action for one of our ambassador species; 4. Set the next challenge to complete at school

The Research Goals

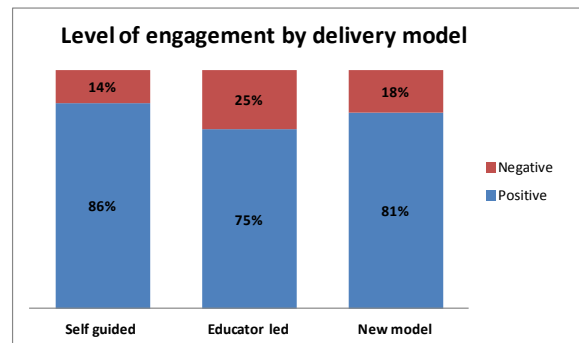
It must be strongly emphasized that the results of this research will be used as a guide to help inform the next steps in the process of redevelopment.

The Research Methodology

Data for this study was collected through direct observations, student surveys, and teacher interviews. Observations of students were used to obtain an understanding of student engagement and self-directed behaviour throughout the day. We noted if they attended face to face sessions or shows and how they explored the exhibits, particularly the five exhibits that are the focus of conservation campaigns. Surveys were administered to each class before they left the zoo to test their understanding of basic conservation concepts and conservation campaign knowledge. Three weeks following their visit the students were again surveyed and asked about actions they had taken to help save wildlife since their visit to the zoo. This was important in understanding the level of behaviour change made by the students and identifying if there is any difference between the models in delivering conservation outcomes. Lastly, teacher interviews were used as a way to understand the trends and outside factors that were unique to each school's visit such as what the students were studying at school, whether they were at the start, middle or end of their unit of work and students' prior learning.

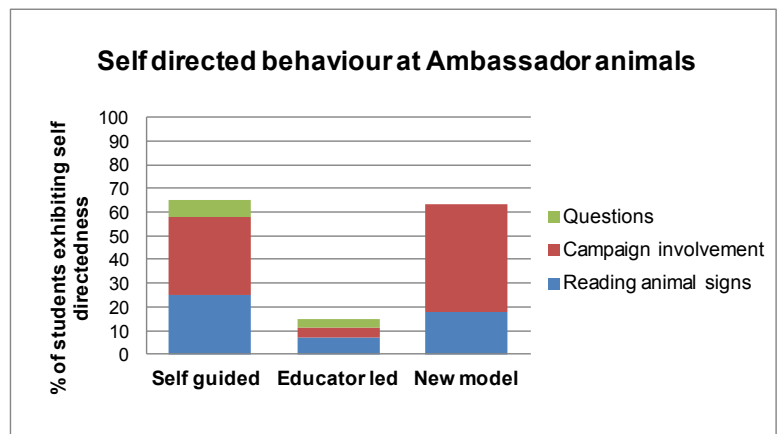
Results of the Research

Researchers found that students had a high level of engagement throughout the day independent of the model they participated in (below). This was very encouraging and specifically showed at animal exhibits, with students being positively engaged 81% of the time in the new model.



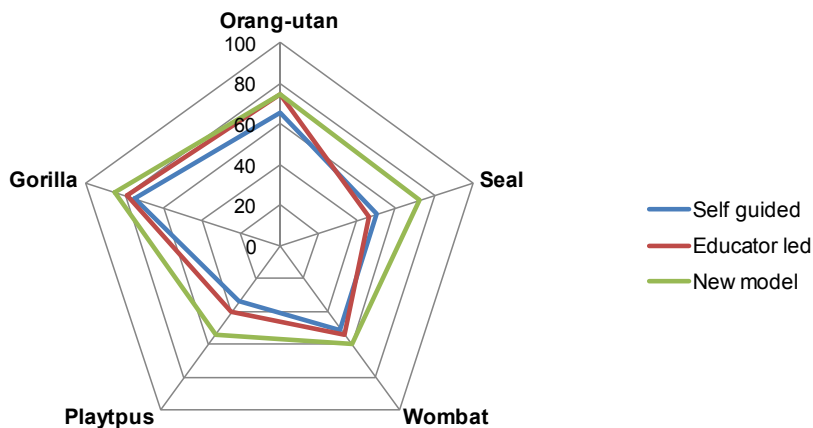
The level of self-directed learning was measured in each of the three delivery models. Students were deemed to be self-directed in their learning if they went out of their way to read animal signs, ask questions of zoo staff or were actively involved at the five ambassador animal exhibits (see below).

The graph below shows that the level of self-directed behaviour displayed by students was significantly higher in both the new and self-guided delivery models.



Gorilla	Platypus	Orang-utan	Seal	Wombat
Recycle old mobile phones	Switch to phosphate free cleaning products	Use certified sustainable palm oil	Recycle plastics	Switch to 100% recycled toilet paper

Comparison of delivery model by animal question



animals were better understood than others. Several factors have been identified as possible contributors to the differences. The research indicates that when students are able to attend a keeper talk the learning and conservation outcomes are significantly higher than for those students who did not attend. The interpretive media (signage, visual and interactive displays) at animal exhibits are also important for student understanding. The signage at the gorilla exhibit is very large, noticeable and easy to connect with, and students from all models scored highest on the

The educator-led model shows that approximately 15% of students observed were self-directed toward their learning, compared to both the new model and the self-guided, which showed 65% of the students self-directed.

Knowledge Acquisition

The diagram above shows that students exposed to the new model, on average, scored higher on knowledge questions about the ambassador animals and their conservation campaign than the students participating in the self-guided and educator led models. The data indicates that there is greater knowledge acquisition when students have heard about an ambassador species from a staff member either from an educator or through a keeper talk or show. For example, students involved in the new model were able to experience the seal show, and as a result they scored very highly on the seal question.

Taking Conservation Action

A follow-up survey completed by the students up to three weeks following their visit tested level of conservation-based behavioural changes and knowledge retention. Schools exposed to the new model and those with a specific education focus to their visit were more likely to participate in the campaign actions following their visit. Due to the short time frame of the follow-up survey it is too early to determine conclusions about the new model and its ability to deliver a greater proportion of behaviour change outcomes, however the results look very positive.

Other Outcomes

For self-guided classes, the richness of the experience depends on their class teacher and the outcomes they desire. Some teachers are highly motivated and knowledgeable. One of the self-guided classes observed was studying Indonesian at their school and their teacher spent 20 minutes with them at the orang-utan exhibit discussing the palm oil issue. These students were highly engaged for their entire zoo visit and as a result scored very well in the knowledge and taking action questions. The outcomes for this class contrasted with other self-guided groups observed.

Through observations of students and survey results it was noted that particular campaigns and ambassador

gorilla conservation question.

An unexpected outcome came from a group of 14 year old students who were considered badly behaved and 'not getting anything' from their educator led experience at the zoo. When the researchers compared learning outcomes of this group with that of a 'well-behaved' group of 13 year old students, there was no difference. This result alone will cause us to rethink what we 'expect' learning to look like in a zoo environment.

The zoo educator delivering the new model noted that the experience was richer for him as he got to check in with the students several times throughout the day and developed a rapport with them that was not usually achieved in a 45 minute educator led model of delivery.

Conclusion and Next Steps

Much of what is learned and taken from a zoo experience seems to come down to expectations: teacher expectations, zoo educator expectations and student expectations. Setting the students up as soon as they arrive at the zoo and meeting them again during the day sets the expectation that the zoo experience is the whole day and that learning occurs throughout the day, not just in a defined block of time.

This research has delivered some encouraging results validating the direction we are moving with the development of a new delivery model for teaching and learning. The new model was found to be engaging, encouraged self-directed learning, delivered both learning and conservation outcomes and can be delivered to a large number of students.

This research shows that being brave and trying a new approach in delivering conservation education in a zoo based conservation organisation can achieve better learning and conservation outcomes than the traditional model and better reflects the changing needs of our students in the 21st century.

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