Towards Effective Environmental Education

By engaging the visiting public with live animals, zoos and aquariums can be effective providers of environmental education | © Zoos Victoria
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In 2010, governments agreed to the United Nations Strategic Plan for Biodiversity 2011–2020, which aims to halt and eventually reverse global biodiversity loss (http://www.cbd.int/sp/default.shtml). To build support and momentum for this urgent task, the United Nations General Assembly declared the period 2011–2020 to be the United Nations Decade on Biodiversity. For this initiative, five strategic goals and 20 ambitious targets were defined, collectively known as the Aichi Biodiversity Targets (http://www.cbd.int/sp/targets/default.shtml). Their purpose is to inspire broad-based action in support of biodiversity. The very first target (Target 1 of Strategic Goal A) states that “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.”

To achieve such a policy target, a major global effort from governments as well as civil society organisations is required. Amongst the wide array of non-governmental organisations officially committed to this effort are accredited zoos and aquariums working through their unifying global organisation, the World Association of Zoos and Aquariums (WAZA). On educational matters, WAZA closely collaborates with the International Zoo Educators Association (IZE). The potential of zoos and aquariums to contribute to Aichi Biodiversity Target 1 is worth investigating given their global popularity. Zoos and aquariums reportedly attract over 700 million visits worldwide every year (Gusset & Dick 2013, Zoo Biol. 30: 566–569). So, can these visits serve a wider public engagement purpose by promoting awareness of biodiversity and sustainable behaviour?

The rhetoric from zoos and aquariums indicates that they see themselves as valuable providers of pro-biodiversity public education. A study analysing US zoos’ mission statements found that 131 out of 136 specifically referenced education; conservation per se was only mentioned in 118 (Patrick et al. 2007, J. Environ. Educ. 38: 53–60). Clearly, zoos and aquariums justify their existence at least partly on educational grounds that directly relate to Aichi Biodiversity Target 1. The majority of zoos and aquariums offer engagement and learning opportunites, but how effective are these educational interventions? Surprisingly, few studies have attempted to measure awareness-raising and learning impacts on zoo and aquarium visitors on a large scale.

WAZA is an official partner of the Convention on Biological Diversity (CBD) during the United Nations Decade on Biodiversity. A global impact evaluation of public biodiversity knowledge was conducted both to address the aforementioned research gap and to aid CBD signatories in their efforts to evaluate Aichi Biodiversity Target 1. This study (see Gusset et al., this issue) provides the most compelling evidence to date that zoo and aquarium visits can (and do) contribute to increasing the number of people who understand biodiversity and the actions they can take to help protect biodiversity. As such, the study gives credence to the claims that zoos and aquariums can be effective providers of pro-biodiversity public education, thereby making a positive contribution to Aichi Biodiversity Target 1.

However, knowledge increases are not necessarily a reliable predictor of a related change in behaviour. In this edition of the WAZA Magazine, edited in collaboration with IZE, we have compiled various conceptual and practical approaches to evaluating the educational impact of visiting a zoo or aquarium. Moreover, we present several educational initiatives implemented by zoos and aquariums specifically aimed at pro-biodiversity behavioural change in their visiting public. As a step towards achieving Aichi Biodiversity Target 1, these contributions collectively strive to make environmental education more effective. As called for in the United Nations Strategic Plan for Biodiversity 2011–2020, we hope that this edition of the WAZA Magazine will inspire broad-based action in support of biodiversity by the world zoo and aquarium community and beyond.

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Zoo Education: Outputs, Outcomes and Measuring the Unexpected

Summary

Zoos exude a certain self-confidence regarding their roles as education providers. The educational outputs of zoos are, at face value, impressive, with most investing in learning opportunities for leisure visitors, educational groups and within their in situ programmes. These outputs are not necessarily reliable indicators of the educational achievements of zoos. Quantity does not equate to quality, just as outputs do not necessarily lead to expected outcomes. Zoo associations offer us a clear insight into the strategic vision underpinning the educational goals for zoo visitors; a heightened appreciation of the value of biodiversity and a connectedness with the natural world. Most zoos have educational goals that ally neatly with the vision of their respective associations. We are left with fairly narrow, top-down educational goals. Research that seeks to explore the impacts of zoo visitors often focuses on evaluating performance based on these educational goals, with findings used as a means of providing evidence of impact and institutional benefits. We are thus left with evidence of impact and institutional benefits on these educational goals; with educational repertoire; for example, signage, interactive interpretation, public talks and animal demonstrations. This diversified approach to educational outputs would seem capable of accommodating differing learning styles and pre-visit agendas. The important question is what strategy determines the design and content of all these educational outputs. We explore this based on a review by Moss & Esson (2013).

Educational Goals of Zoo Associations

Traditionally, zoos have offered formal, educator-led teaching to educational groups. Other outputs in the form of educational materials and activities are also part of zoos’ educational repertoire; for example, signage, interactive interpretation, public talks and animal demonstrations. This diversified approach to educational outputs would seem capable of accommodating differing learning styles and pre-visit agendas. The important question is what strategy determines the design and content of all these educational outputs. We explore this based on a review by Moss & Esson (2013).

At a strategic level, zoo associations state clear educational goals. Table 1 summarises these for the major worldwide organisations. Strong similarities exist between the educational goals of the associations, particularly in the use of aspirational, emotive language. But, to zoo critics, the use of aspirational and emotive language could suggest that either these goals are yet to be met or there is a lack of evidence to support stronger, more outcome-oriented statements. Both are probably true to some extent.

Educational Goals of Zoos

Patrick et al. (2007) found that the theme of education was mentioned in 132 out of 136 (AZA) zoo mission statements analysed. Education appeared more frequently than the theme of conservation (128 out of 136 statements). Clearly, education is seen by zoos as core to their respective missions. When we look in detail at individual zoos, of which about 1,300 fall within the network of WAZA, we find a mixed picture. Superficially, zoos appear to say the same thing, but differences in written emphasis, regarding their educational value, have created a situation where some zoos make very strong claims; others are more reserved.

Lincoln Park Zoo states they “create multiple opportunities for visitors of all ages and backgrounds to have meaningful experiences at the zoo. We invite you to feel connected, committed and curious in our wild classroom.” This tells us that learning opportunities are available and how the zoo would like visitors to experience them, stopping short of claiming that visitors are having “meaningful experiences” or do feel “connected, committed and curious” as a result of their visit. Smithsonian’s National Zoo is more confident, stating they “educate and inspire diverse communities so they become part of our commitment to celebrate, study and protect animals and their habitats.” Taronga Zoo states that their “education programmes inspire people of all ages to make a personal contribution to conservation.” Wildlife Reserves Singapore state that “Living Classrooms takes everyone on a learning journey that highlights the interdependency of nature’s inhabitants and the significance of appreciating them.”

These examples do not claim to be representative of zoos’ educational goals. We merely seek to highlight the potential issue of over-exaggerating claims of educational impact. This leads us to believe that there is some blurring of the distinction between educational aspiration and outputs with measurable educational outcomes (Fig. 3). It appears that there is, in some cases, a false perception that by simply “aspiring to” or “providing” somehow leads directly and linearly to “achieving” the aspired-to outcomes. We argue that by making claims such as those quoted above, zoo associations and zoos leave themselves open to external criticism of their claims as education providers. We need not look far to find examples of criticism aimed at zoos and their stated educational roles (e.g. Marino et al. 2020).

Table 1: The educational goals of major zoo associations.

<table>
<thead>
<tr>
<th>Zoo association</th>
<th>Educational goals</th>
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<tbody>
<tr>
<td>WAZA</td>
<td>“The educational role is to interpret living collections to attract, inspire and enable people from all walks of life to act positively for conservation.”</td>
</tr>
<tr>
<td>Association of Zoos and Aquariums (AZA)</td>
<td>“The educational role of zoos and aquariums will be socially, environmentally and culturally relevant, and by influencing people’s behaviour and values, education will be seen as an important conservation activity.”</td>
</tr>
<tr>
<td>Association of Zoos and Aquariums (AIA)</td>
<td>“To create an urgent awareness among the millions of European zoo visitors of the fact that the long-term survival of a living human population on earth is fully dependent on the rapid development of sustainability on a global scale. And, through the creation of this awareness, to evoke individual and collective political action aiming at reaching global sustainable levels of all human activities within the next three to five decades.”</td>
</tr>
<tr>
<td>African Association of Zoos and Aquariums</td>
<td>“The World Zoo and Aquarium Conservation Strategy recognises that zoos and aquariums reach hundreds of millions of people all over the world. Further, most of these visitors are from urban environments with little or no contact with wild animals whether in the bush or in the ocean or lake. It shall be remembered that the future of species held in zoos and aquariums depends on people and the educational role of zoos and aquariums in conservation cannot be overestimated.”</td>
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<tr>
<td>South East Asian Zoo Association</td>
<td>“The vision of the South East Asian Zoo Association is that its member zoos utilise their animal collections for the primary purposes of educating our public by imparting messages on the urgent need for environmental conservation in a manner that upholds the rights and dignity of the wild animal.”</td>
</tr>
<tr>
<td>British and Irish Association of Zoos and Aquariums</td>
<td>“WAZA collections aim to provide unique lifelong learning opportunities, to raise awareness, to increase respect and knowledge about wildlife and global issues, and to engage and connect people of all ages with the natural world.”</td>
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</table>

Away from these rather formally crafted goals for zoo education, zoo associations exude, via their websites, a self-confidence regarding their educational value. For example, the Association of Zoos and Aquariums (AZA), on its education website, states that “AZA-accredited zoos and aquariums play a vital role in educating over 275 million visitors, and 12 million students in the classroom or in the field.” As this figure of 275 million equates to all annual visits to AZA zoos, this suggests that every visitor is being educated according to AZA’s vision. This reports an educational outcome that must have an existential base to be valid. The British and Irish Association of Zoos and Aquariums (BIAZA) states that “We can send essential conservation messages out into the wider population, carried by our visitors, reaching the audiences that will determine the fate of threatened habitats and species.” This statement is reporting a causal chain moving from zoo education to global conservation, but how do we know that even the first part of this chain (the “essential conservation messages”) is being achieved?
The fact that zoo associations have clearly defined goals relating to the learning they wish to take place in their member institutions does not necessarily sit comfortably with what is the more generally accepted model of learning in zoos. Visitors will construct personal meaning from their visit based on their pre-existing knowledge, attitudes and motivations for visiting (Falk 2005). This type of learning is also self-directed and, this is the most salient point, entirely “free-choice”.

Regardless of learning style or a zoo’s educational provision, some visitors may simply “choose” not to engage, as planned or predicted, with educational approaches. The key issue is that attempting to prescribe universal educational approaches. The key issue is that attempting to prescribe universal educational aspirations and designs educational resources and activities to deliver these, the visitor outcomes must be positive. They may not be.

By limiting research to investigate only the achievement of institutional goals, researchers are limiting the scope of their work. Even if it were possible to evidence that an educational output correlates with the outcome we expected does not mean that this is the only outcome. There may be other social, cultural or emotional outcomes that could also be insightful. We acknowledge that there is a body of work that has sought to explore a range of outcomes from a zoo visit, although we find that there are a number of visitor-related studies in zoos that focus on changes in knowledge, attitudes or behaviour, and are often solely quantitative in approach. Mixed-methods designs incorporating qualitative methods may be more adept at uncovering outcomes outside those of the prescribed research question(s). Triangulation of this kind would give added credence to (more generalisable) quantitative findings.

Even if not used as part of mixed-methods research, separate qualitative studies could be implemented to uncover a more meaningful range of outcomes to be validated (or otherwise) by quantitative approaches. The key issue is that zoo visitor research often attempts to answer questions such as “are zoo visitors getting what we want them to get out of their visit”? In zoos, it is also insightful and valuable to pose the question “what are zoo visitors getting out of their visit”? This approach was implemented as part of WAZA’s recent global evaluation of biodiversity literacy in zoo and aquarium visitors (see Gusset et al., this issue), where data were sought regarding visitor understanding of the term “biodiversity” (using an open question), rather than testing to see if they could provide the definition we, as a conservation community, approved and were looking for.

There is also perhaps the danger that zoos do not fully understand the processes involved in social change. In particular, that the “ideals” held by the institutions do not automatically translate into “practices” at the level of the visiting public (Jensen & Wagoner 2009). Of more concern is that, by assuming increased knowledge may be influential in affecting public attitude and behaviour, zoos are becoming perilously close to revisiting the now discredited “deficit model” of science communication. Hereby it was assumed that widespread public support of, and attitudes towards, science was essentially a problem of deficient scientific literacy among the public, and that by simply filling that “deficit” with knowledge, support for science would follow. So, it cannot be assumed that an increase in pro-conservation visitor knowledge, via zoo education, will, in any causal way, lead to changes in attitudes or (and this is perhaps what zoos most seek to influence) behaviour change.

A standard methodological approach in visitor impact research is a pre- and post-test design, using repeated measures or two different visitor samples from the same visitor population. Statistically comparing pre- and post-test differences between two visitor samples necessarily requires using the aggregated “scores” from the two measurements. This quantifies overall differences between the two samples, but it does not tell us about specific changes in individual cases. This means that if the overall (aggregated) change was positive, there may still be some individuals showing negative changes. We are aware of very few zoo studies that tracked individual cases and actively looked for deviant outcomes. Of those that did, negative cases were unexpected and overall trend being positive. Looking for negatives might seem counter-intuitive, but it is also the route to a solution. Only by uncovering areas of potential negative impact can we target improvements specifically.
Developing Zoo Evaluation and Visitor Research: The Importance of Expertise and Technology

Summary
Evaluation is incredibly important for zoos’ and aquariums’ relationships with their visitors. Without evaluation, visitors are relying on unreliable "gut instincts" to determine whether effective experiences are being provided for visitors. High-quality evaluation and visitor research that is skilfully conducted and effectively shared can provide a basis for visitor-facing staff to discover what aspects of the zoo or aquarium experience are working, in what ways, with which audiences and why.

Problematic Patterns in Evaluation and Visitor Research
Most zoos and aquariums do some form of evaluation or visitor research. However, "industry standard" visitor surveys and evaluation procedures are often flawed, with basic errors in survey or observation design, sampling, analysis and interpretation. Indeed, I have used examples from zoo and aquarium evaluations conducted by industry-leading consultants and institutions in my university teaching to demonstrate poor practice in survey design and inferential reasoning.

It seems that zoos and aquariums are generally uncritical consumers (and producers) of evaluation and visitor research, quick to believe that measuring complex outcomes can be incredibly simple. Want to know whether a child has learned a lot about conservation after her day at the zoo? Easy! Just ask her: "Did you learn about conservation during your visit today? Yes or no?" For example, an evaluation commissioned by the Zoological Society of London – London Zoo claimed that of those attending a Galapagos tortoise exhibit, "72.9% of visitors learnt something". This claim is based on a post-visit "level of agreement" question phrased as follows: "It taught me interesting facts".

An even more ubiquitous line of problematic evaluation practice in zoo and aquarium education involves asking teachers or parents to report on learning or other outcomes on behalf of their pupils or children. Asking questions like "did your child learn anything at the zoo today?" to make claims about children’s learning would get laughed out of the room in a first-year undergraduate sociology seminar, yet it is routinely used by consultants and zoo and aquarium professionals boasting decades of experience. To measure children’s attitudes or learning, you must gather data directly from them using appropriate language and good survey design techniques. Current evaluation practices in zoos and aquariums are discussed in more detail in a meta-analysis report that I produced for the Durrell Wildlife Conservation Trust for a project funded by the European Commission (see https://www.academia.edu/23534707/Critical_Review_of_Conservation_Education_and_Engagement_Practices_in_European_Zoos_and_Aquariums).

Beyond basic methodological flaws, key lines of enquiry within zoo and aquarium evaluation and visitor research are often neglected, such as non-visitors’ reasons for not going to zoos and aquariums, long-term impacts, data collection beyond the physical confines of the zoo or aquarium and the possibility of negative impacts (see Jensen 2011; Dawson & Jensen 2011; Jensen et al. 2011). This neglect occludes the vision of zoos and aquariums as a field of practice by hiding vital information necessary for improving inclusion, impact and the visitor experience over time.

Solutions to Improve Evaluation and Visitor Research
Good zoo and aquarium evaluation and visitor research requires upstream planning and clear objectives from zoo and aquarium staff. Moreover, results should inform practice across the zoo or aquarium. It also requires training (either externally provided or self-taught) in relevant social scientific research methods (e.g. survey design). Or at least such training was required until very recently (see below).

Zoo and aquarium marketers, educators and managers are busy people. Most of them have not been trained in social scientific research methods required to produce valid visitor evaluations or be a critical consumer of visitor research and impact evaluations conducted by others. This no doubt helps to explain the ubiquity of poor-quality visitor research and evaluation in this field, including in much of the published empirical zoo
and aquarium visitor studies literature. A couple of years back, I tried one option to help the situation by offering a series of training seminars on impact evaluation of public engagement and informal learning with support from the Wellcome Trust and the British Science Association. I have also led other training courses on visitor studies methods at the European Association of Zoos and Aquaria (EAZA) education conference and UK zoo and aquarium conferences. While a lot of zoo and aquarium staff came to these sessions, I do not think that training per se is a feasible solution for the sector as a whole, unless the ability to design, conduct and analyse visitor evaluations comes to be viewed as a core skill for visitor-facing staff in zoos and aquariums. This is because it takes time to learn how to design and then to actually conduct valid data collection and analysis, and many zoo and aquarium professionals are just too pressed with other priorities to undergo such extensive training.

Therefore, I have come to the conclusion that the best contribution I can make for the sector is to provide evaluation templates and systems that do not require expertise in social scientific research methods. Firstly, I have published examples of impact evaluation survey questions and forms that I have designed for past zoo and aquarium projects and which I am happy for Zoo and aquarium staff to re-use on my website. For example, the impact survey forms and questions from Gusset et al. (this issue) could be used by other zoos and aquariums.

Most recently, I have explored an alternative that could be a real solution for zoos and aquariums interested in embedding evaluation and visitor research into the fabric of their institutions. What proportion of visitors are satisfied with their experiences at a zoo or aquarium? What factors are affecting the quantity and type of impact you are having on visitors? These are just a few of the questions that can be addressed using automated evaluation and feedback tools. Automated methods of evaluation can be used to effectively summarise large amounts of data from multiple sources, drawing useful comparisons to provide valid insights about what aspects of zoo or aquarium visits are yielding positive or negative results.

New technologies enable the design of evaluation systems that can be fully automated after an initial customisation and setup. Using these technologies, a one-time infusion of expertise can create a system used by zoo and aquarium professionals without any skills in social scientific analysis. I have explored this possibility over the last 15 months through the Qualia project (funded by a UK government’s Digital R&D Fund for the Arts). The goal was to use a one-time investment of public money to build a high-quality open-source system that could be used by cultural institutions with their visitors to gather evaluation data automatically, with a bare minimum of customisation required to deliver real-time results. The system has just been completed. How it could work for zoos and aquariums has been described in some detail elsewhere (see http://qualiaanalytics.blogspot.co.uk/2014/04/zoos.html).

Technologies that could be used by zoos and aquariums for evaluation include:

- Visitor app, a native iPhone and Android app that includes schedule function for animal talks and feedings (automatic feedback questions after events), social media function for Twitter and Facebook posts through the app, zoo map, zoo information, automatic feedback request after visit either in app or by short linked web survey. While this app builds on technical infra-structure that was built and tested for the Qualia project over the last year, it appears to be the zoo’s own visitor app, with only the zoo’s branding on it.
- Zoo visitor insight dashboard with real-time results of automated analyses feeding in (Fig. 2). Automatic alerts can be sent to relevant personnel when feedback dips below a minimum threshold, etc.
- Information kiosk touch-screens with event information, zoo map and feedback features that automatically feed into the analytics.
- Automated smile detection at key service points to objectively measure visitor satisfaction or dis-satisfaction.
- Automated sentiment analysis of social media data, including mentions of the zoo on Facebook and Twitter.

I have subjected these different technologies to rigorous validity and reliability testing as part of the Qualia project, and in the end I do think that it is a workable system. It has been built using open-source software development, so the system can be easily adopted by zoos, aquariums and other organisations (saving enormous sums of money across the sector by replacing existing consultancy costs and offering better quality, real-time visitor evaluation results). If this kind of system is widely adopted over time, then it would be feasible to build up sector-wide data on the impacts of zoo and aquarium experiences that are valid at the individual level. This could also be achieved using conventional social scientific methods (e.g. Jensen 2014), but that would require a much larger ongoing investment of resources. Ideally, if the cost burden of ongoing visitor evaluation and market research consultancy could be removed, the sector would then be able to focus on strategic investment in in-depth rigorous research on aspects of visitor engagement that require particular attention.

Conclusion

This article has summarised some of the problems currently affecting zoo and aquarium evaluation and visitor research. For example, the most basic principles of survey and research design are routinely violated in evaluation (commissioned) by zoos and aquariums large and small. The article has also highlighted possible solutions. In particular, I have suggested looking to recent breakthroughs in social technology to deliver better quality visitor research that provides more useful insights for far less cost than current approaches. This would allow zoos and aquariums to be much better attuned to their visitors’ needs, less reliant on speculative notions about which interventions are effective and, therefore, more likely to deliver pro-conservation impacts. Using robust social scientific evidence to ensure success at the vital task of engaging visitors with wildlife conservation should be viewed as a basic necessity across the sector. Given the challenges of such a task, zoos and aquariums should be using every social and technological tool available to deliver pro-conservation social change.

References

Evidence for the Educational Value of Zoos and Aquariums

Summary

Although zoos and aquariums have long asserted that they meaningfully contribute to the public’s conservation understanding, attitudes and behaviors, until recently solid evidence was lacking. Research over the past decade does indeed show that zoos and aquariums impact their publics. Of particular importance were the findings of a series of studies called the Multi-Institutional Research Project, which showed that a visit to a zoo or aquarium resulted in significant enhancements in conservation-related knowledge, attitudes and behaviors. Equally relevant were the important insights that the research provided for how to improve zoo and aquarium practice.

Introduction

Zoos and aquariums all over the world strive to make a difference for wildlife and wild places by sharing their passion for conservation with the hundreds of millions of people who visit each year. They create interactive exhibitions, interpretive tours and educational programs that enable people to engage with and learn about living animals and in so doing seek to influence their visitors in significant ways. However, questions continue to arise whether these represent just good intentions. Do zoo and aquarium visits actually translate to changes in the public’s conservation understanding, attitudes and behaviors? Over the past decade several efforts have been launched to better understand and directly measure the educational impact of zoo and aquarium visits. To date, the largest and most comprehensive of these efforts was the Association of Zoos & Aquariums Multi-Institutional Research Project (MIRP).

Methodology

The core study in the MIRP process involved collecting data from a random sample of 1,862 adults visiting two zoos and two aquariums chosen to be collectively representative of the broader zoo and aquarium community. At all four sites, visitors completed an entrance questionnaire designed to measure their pre-existing visit motivations and to determine where in the zoo or aquarium visitors went and why (n = 83) conducted roughly one year after the visit. The study found that a visit to these zoos and aquariums had a measurable impact on the conservation attitudes and understanding of adult visitors. Overall, the study found that:

• Visitors arrive at zoos and aquariums with specific visit motivations and these motivations directly impacted how visitors conducted their visit and what meaning they made from the experience.
• Overall, visitors were found to possess a higher-than-expected entering knowledge about basic ecological concepts. Some groups of visitors showed significant changes in their conservation-related knowledge; however, because of the higher than expected entering knowledge of most visitors, many did not show changes in knowledge.
• For a large majority of visitors, the zoo and aquarium experience significantly reinforced and in most cases enhanced their values and attitudes towards conservation.

Findings

The study in the MIRP process involved collecting data from a random sample of 1,862 adults visiting two zoos and two aquariums chosen to be collectively representative of the broader zoo and aquarium community. At all four sites, visitors completed an entrance questionnaire designed to measure their pre-existing visit motivations, knowledge, attitudes and conservation-related behaviors. The same visitors again completed a questionnaire upon exiting. In addition, two other datasets were collected; a series of one-on-one interviews to determine where in the zoo or aquarium visitors went and why (n = 356) and a long-term follow-up interview (n = 83) conducted roughly one year after the visit.

These findings are really not so surprising, given what we now know about the nature of interest and learning. Most individuals develop their interest, understanding and attitudes towards animals and conservation through an accumulation of experiences from different sources at different times, such as having and helping to care for a family pet, learning about biology in school, watching hundreds of hours of television nature shows, reading or being read to dozens of books about animals, and participating in numerous visits to parks, farms and zoos and aquariums. None of these experiences alone can lead to “cause” someone to know or care about animals.

Thus, we cannot assume that visitors arrive at a zoo or aquarium tabula rasa; they arrive with prior knowledge, experience and interests related to animals and conservation. They also arrive with specific motivations for their visit (Fig. 1). All of these influence what they get out of their visit experience and thus need to be taken into consideration when framing research on the impact of zoos and aquariums. Accordingly, the MIRP study sought to measure the entering animal and conservation knowledge, attitudes, behaviours and visit motivations of zoo and aquarium visitors and then to determine what, if any, changes in these occurred as a result of the visit.

A Framework for Assessing Zoo and Aquarium Impact

Zoos and aquariums do not exist as islands, but are part of a larger learning ecosystem. In other words, children and adults pursue their interests and develop their understandings and attitudes about animals and conservation over the course of a lifetime, in and out of school, using a variety of community resources and media, including electronic and print media, conversations with friends and family and through direct experiences at home and in the wider world. In this regard, zoos and aquariums represent just one node within a complex ecosystem of learning institutions, most of which, like zoos and aquariums, are primarily designed to support free-choice learning—the learning people do when they exercise some measure of control over what, when, how and with whom to learn. Although it is increasingly appreciated that many institutions and forms of media significantly contribute to the public’s learning, most people still assume that most learning takes place in school. A range of studies are beginning to show that this is actually not the case; in fact, most people learn most of what they know, including topics like science and conservation, outside of school (Falk & Needham 2013).

This study though, it is important to provide a little background on the nature of learning and how that understanding influences how one would go about measuring the educational impact of a zoo or aquarium.
Visits to zoos and aquariums serve to increase visitors’ feelings that they are part of a conservation effort; part of a larger movement. Visitors already leave with a stronger idea of their role in environmental problems, an understanding that they are “part of the solution”. However, this remains an area where even more effort could yield large dividends. Zoos and aquariums should continue to emphasise conservation action in educational programming and exhibitions. Visitors want to be involved in conservation and are looking to institutions to help them know exactly how they can best make a difference. Accordingly, institutions should continue to explain their animal welfare standards and demonstrate how they care for animals in their care and in the wild; and, as appropriate, how these efforts relate to the work of many other organisations and programmes. In other words, embrace the fact that you are part of a larger ecosystem of animal welfare and conservation efforts.

Finally, many members of the public do see zoo and aquarium experiences as vicarious wilderness experiences, and zoos and aquariums can do more to emphasise this aspect of the experience, especially given that for an increasing number of urban dwellers a visit to a zoo or aquarium may be the only “nature experience” they have. Since there is increasing evidence that spending time in nature is critical if people are to develop an environmental ethic, zoos and aquariums need to work to make every visit feel like an exploration and create in the visitor a sense of wonder about nature. The research suggests that visitors are primed for these kinds of experiences, but that additional efforts are needed if all visitors are to leave feeling good about these types of experiences.

These findings are by no means trivial, but clearly there is room for improvement. Although the research reported here represents studies across only a handful of zoos and aquariums, it is important to view these results within the larger context of research on the impact of informal education institutions generally. For example, a recently completed international investigation of the impact of science centres on their communities, involving 37 institutions across 13 countries, found a highly significant relationship between visits and a whole suite of key science-related outcomes, including knowledge, attitudes, success in school and careers (Falk et al. 2014).

Given how consistent such results are, despite coming from widely differing institutions, countries, communities and circumstances, they collectively provide a strong and compelling case for the value of free-choice learning institutions like zoos and aquariums. Studies like MIRP and others now allow zoos and aquariums to more confidently assert that there is evidence that individuals who visit these institutions have a significantly greater likelihood than those who do not visit them to understand animal biology and ecology, be interested in animals and their welfare, and have an increased likelihood to engage in pro-environmental behaviours. In other words, this research shows that the presence of one or more healthy and active zoos and/or aquariums within a community, region or country represents a vital mechanism for fostering and maintaining an environmentally literate and engaged citizenry.

References


• The visit prompted many individuals to reconsider their role in environmental problems and conservation action, and to see themselves as part of the solution.
• Roughly half of all visitors believed that zoos and aquariums play an important role in conservation education and animal care.
• A majority of visitors believed that their zoo or aquarium experience significantly strengthened their connection to nature (Fig. 2).

A key part of the study was the follow-up interviews of visitors roughly one year after their zoo or aquarium visit. Despite the lapse of time, virtually all could talk about their visit and remembered a number of details about the experience. Roughly half of visitors mentioned a particular animal or species as the highlight of their visit, 49% of visitors mentioned conservation-oriented themes. And reinforcing our earlier findings, a majority of visitors in this long-term follow-up indicated that they believed that zoos and aquariums play an important role in species preservation and in increasing their visitors’ awareness of conservation issues.

Implications

These results, especially when combined with the dozens of other studies on zoo and aquarium impact (e.g. Gusset et al., this issue), suggest that zoos and aquariums do have a significant impact on the conservation knowledge, attitudes and behaviours of visitors. Collectively, these investigations suggest a number of possible implications for zoo and aquarium practice. Given the importance of prior knowledge, interest and motivations, it behoves zoos and aquariums to learn more about their visitors. In particular, it is time that zoos and aquariums attempt to customise offerings to better meet the needs of their diverse visiting publics, publics with different needs, interests and expectations for their visit.

Although many zoo and aquarium professionals seem convinced that the public needs to learn basic information about animal biology, ecology and conservation, the research suggests that most visitors already know quite a lot about these basic content areas. In fact, experimental exhibits have demonstrated that visitors are prepared to consume and understand quite complex biological phenomena like animal thinking (Sickler et al. 2006). Consequently, zoos and aquariums should spend more time on specific conservation and natural history messages and content, and less on the basics. A similar conclusion relates to conservation attitudes. Zoos and aquariums do not need to convince their publics that animals are special and require targeted conservation efforts to keep safe and preserve species. Visitors already enter with this understanding and commitment and are looking for specific ways they can help make a difference. Most visitors are ready to be more engaged in advocacy efforts, as long as these do not come across as “preachy” and overly dogmatic.

Fig. 2 Visiting a zoo or aquarium can strengthen people’s connection to nature. © Wildlife Conservation Society

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Evidence for the Educational Value

Evidence for the Educational Value
Biodiversity Understanding and Knowledge of Actions to Help Protect Biodiversity in Zoo and Aquarium Visitors

Markus Gusset1,*, Andrew Moss2 & Eric Jensen3

Summary

We conducted a large-scale impact evaluation study, using a pre- and post-visit repeated-measures survey design, to evaluate biodiversity understanding and knowledge of actions to help protect biodiversity in zoo and aquarium visitors. Our findings are based on the largest and most international study of zoo and aquarium visitors ever conducted worldwide; in total, more than 6,000 visitors to 30 zoos and aquariums around the globe participated in the study. The study’s main finding is that aggregate biodiversity understanding and knowledge of actions to help protect biodiversity both significantly increased over the course of zoo and aquarium visits. There was an increase from pre-visit (50.5%) to post-visit (58.8%) in respondents demonstrating at least some positive evidence of biodiversity understanding. Similarly, there was an increase from pre-visit (50.9%) to post-visit (58.8%) in respondents that could identify a pro-biodiversity action that could be achieved at an individual level. This study provides the most compelling evidence to date that zoo and aquarium visits can contribute to increasing the number of people who understand biodiversity and know actions they can take to help protect biodiversity.

Introduction

In 2010, governments agreed to the Strategic Plan for Biodiversity 2011–2020, which is aimed at halting and eventually reversing the loss of biodiversity of the planet (http://www.cbd.int/sp/default.shtml). To build support and momentum for this urgent task, the United Nations General Assembly declared the period 2011–2020 to be the United Nations Decade on Biodiversity. There are five strategic goals and 20 ambitious targets, collectively known as the Aichi Biodiversity Targets (http://www.cbd.int/sp/targets/default.shtml). Their purpose is to inspire broad-based action in support of biodiversity over this decade. The very first target (Target 1 of Strategic Goal A) states that “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”. WAZA is an official partner of the Convention on Biological Diversity (CBD) during the Decade on Biodiversity. As a contribution to achieve Aichi Biodiversity Target 1, WAZA launched a campaign for raising awareness about biodiversity in zoo and aquarium visitors. This campaign is accompanied by a global evaluation of biodiversity literacy in zoo and aquarium visitors. Environmental education, and measuring its impact, is one of the primary aims of modern zoos and aquariums, as stipulated in the World Zoo and Aquarium Conservation Strategy (WAZA 2005). However, a large-scale evaluation of the educational impacts of visits to zoos and aquariums is entirely lacking in the existing literature. It is also needed by CBD for evaluating Aichi Biodiversity Target 1.

The potential of zoos and aquariums to be influential in achieving Aichi Biodiversity Target 1 should not be underestimated. With more than 700 million visits worldwide every year (Gusset & Dick 2011), zoos and aquariums may be uniquely placed to contribute to the goal of raising understanding of biodiversity and actions to help protect biodiversity. Zoos and aquariums are undoubtedly providers of environmental education. However, they have been guilty of making strong, causal claims regarding the educational impacts of visiting zoos and aquariums, without having sufficient empirical evidence to justify these claims (Moss & Exon 2013). Clearly, there is a need for an international evaluation study using scientifically rigorous methods to provide direct impact measurement relevant to Aichi Biodiversity Target 1.

In our study (for details, see Moss et al. 2014), we assessed biodiversity understanding and knowledge of actions to help protect biodiversity in a large sample (more than 6,000 visitors to 30 zoos and aquariums) from across the globe (Fig. 1). It is important to stress that we employed a repeated-measures survey design, that is, the same respondents were measured twice, once just before their visit and again just before leaving. The two dependent variables (biodiversity understanding and knowledge of actions to help protect biodiversity) were operationalised using matching open-ended questions in both the pre- and post-visit surveys, followed by robust content analysis. This will help us evaluate Aichi Biodiversity Target 1 – to what extent people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably – and measure the educational impacts of visits to zoos and aquariums. We sought to answer the following research questions: (1) Do zoo and aquarium visitors understand the term biodiversity? (2) Do zoo and aquarium visitors understand the actions they can take to help protect biodiversity? (3) Can zoos and aquariums make a positive contribution to Aichi Biodiversity Target 1?

Do Zoo and Aquarium Visitors Understand the Term Biodiversity?

Overall, 69.8% of zoo and aquarium visitors responding to this survey demonstrated at least some positive evidence of biodiversity understanding before their visit. “Some positive evidence” in this case would indicate knowing that biodiversity is related to biological phenomena, but with no evidence of understanding the breadth or variety of plant and animal species, the interdependency of species, the genetic value of biodiversity, the importance of biodiversity for humans or the need for biodiversity conservation. There were gradations in the depth of understanding on this topic among respondents. Indeed, the top 9.9% of pre-visit respondents provided strongly positive evidence of biodiversity understanding. This would usually include not only a correct definition of biodiversity but also further understanding of a number of the additional dimensions listed above. The sobering finding here, however, was that the remaining 90.1% of pre-visit respondents had poor to no understanding of biodiversity. There was no evidence that these individuals even understood that biodiversity was related to biological phenomena in any way.

Respondents that were zoo or aquarium members (or season ticket holders) (26.2%) and repeat visitors (38.6%) had significantly higher levels of pre-visit biodiversity understanding. The fact that first-time zoo and aquarium visitors (28.6%) have a significantly lower level of pre-visit biodiversity understanding than repeat visitors hints at a correlation between repeatedly visiting zoos and aquariums and higher biodiversity understanding.

Do Zoo and Aquarium Visitors Understand the Actions They Can Take to Help Protect Biodiversity?

Despite 62.1% of respondents before their visit reporting they had undertaken an action to help protect biodiversity in the month prior to completing the survey, in fact only 30.5% of reported actions could be achieved at an individual level. Therefore, in contrast to biodiversity understanding, it appears that respondents are less clear in their understanding of actions they can take to help protect biodiversity. This is clearly an area where zoos and aquariums can target educational programming to maximise knowledge of pro-biodiversity actions.
The categorisation of reported actions or behaviours was also revealing. Zoos and aquariums overwhelmingly see and portray themselves as biodiversity conservation organisations (Patrick et al. 2007), yet only 3.8% of respondents saw visiting a zoo or aquarium as an action to help protect biodiversity before their visit. This would not be such a striking finding if it were not coupled with the fact that 14.4% of respondents cited supporting other relevant organisations (most often WWF), financially or otherwise, as an action to help protect biodiversity. However, the action category “zoos and aquariums” showed a significant increase between pre- and post-visit (from 3.8% to 4.5%). Again, this would be an obvious theme for future zoo and aquarium education programmes.

Can Zoos and Aquariums Make a Positive Contribution to Aichi Biodiversity Target 1?

Respondents’ biodiversity understanding and knowledge of actions to help protect biodiversity both significantly increased between pre- and post-visit (Fig. 2). There was an increase from pre-visit (69.8%) to post-visit (75.1%) in respondents demonstrating at least some positive evidence of biodiversity understanding. Similarly, there was an increase from pre-visit (50.5%) to post-visit (58.8%) in respondents that could identify a pro-biodiversity action that could be achieved at an individual level. This suggests that zoos and aquariums can make a positive contribution to Aichi Biodiversity Target 1, as zoos and aquariums are increasing the number of people who understand biodiversity. They are also bolstering the ranks of those who are aware of the steps they can take to conserve and use biodiversity sustainably by improving knowledge of actions to help protect biodiversity. Furthermore, our findings provide a much-needed baseline for CBD to measure progress towards achieving Aichi Biodiversity Target 1.

Conclusions

To our knowledge, this is the largest survey of its kind conducted to date. The two dependent variables of biodiversity literacy measured in our study correspond to the two components of Aichi Biodiversity Target 1: biodiversity awareness and knowledge of how to conserve biodiversity and use it sustainably. By using a repeat-measures survey design, we were able to assess any differences in the direction and magnitude of these zoo and aquarium visitor outcomes from pre- to post-visit. The overarching finding here is that a significant number of respondents saw or heard biodiversity information during their visit. Thus, zoos and aquariums would be well-advised to increase visitors’ exposure to biodiversity information at their institutions to reap the benefit of improved learning outcomes identified by this study. For example, screening videos and films, which only about a quarter of respondents (27.3%) reported watching during their visit, could promote knowledge of pro-biodiversity actions in conjunction with physically visiting a zoo or aquarium. The campaign that WAZA launched for raising awareness about biodiversity in zoo and aquarium visitors is about facilitating exposure to biodiversity information, including the provision of videos.

Acknowledgements

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References

Summary

Advances in technology improve our ability to communicate, tap previously inaccessible resources, fight ever more complex wars and cure previously incurable diseases; they also drive us further away from nature, the very foundation upon which our society exists. Virtual reality has rekindled a connection with nature and animals is critical for the future of humankind. Zoos and aquariums can, through research, education and visitor experiences, help to reverse the current tide of destruction threatening to overwhelm the planet. This can be achieved by stimulating people to care, equipping them with the knowledge to take action and providing them with the tools they need to act. However, there is still much to learn about how to do this more effectively and research into this field is not yet fully developed. This article presents some results of recent international research that investigated the congruency between visitors’ views on the role of zoos and aquariums and the conservation mission of such facilities, and shares some suggestions of how to enhance environmental learning and encourage post-visit environmental behaviour.

What Do We Already Know?

Despite an exceptionally long history, zoos and aquariums continue to play a controversial role in conservation. In response to both internal and external pressure, during the early 1980s zoos and aquariums started to reposition and promote their role in conservation and education. Zoos and aquariums are increasingly scrutinised on the quality of their animal care, their real value to in situ and ex situ animal and habitat conservation and the impact of their formal and informal (free-choice) education programmes. In the absence of evidence in the form of reliable data, the justification for keeping wild animals in human care remains subjective. The challenge facing zoos and aquariums is, therefore, to transform themselves into powerful conservation organisations, and to critically analyse and measure their effectiveness in conservation (in all facets), in order to honestly address the shortcomings preventing this transformation (Fraser & Wharton 2007). Only once a zoo’s or aquarium’s message and its actions are aligned, will their credibility as conservation organisations be fully accepted.

In 1972, the first paper questioning the educational value of a visit to a zoo was published with the comment that “we must learn the extent to which the zoo serves to develop a proper environmental ethic” (Sommer 1972). This comment is probably even more relevant today than it was in 1972. An understanding of the role of the zoo or aquarium as a part of an overall matrix of awareness-raising experiences is important – one visit to a zoo or aquarium is unlikely to turn visitors into active environmentalists; however, the visit builds on past experiences and lays a foundation for future experiences, which together can play a role in sensitising people to the need to engage in environmentally responsible behaviours (Ballantyne & Packer 2011). It has been argued that, in order for zoos and aquariums to really influence the behaviour of visitors when they return home, it is essential that the visit be “extended” through the provision of post-visit resources (Ballantyne & Packer 2011, Hughes et al. 2011). Working out how to best reach the visitor after the experience is becoming progressively important. Such research indicates that the provision of post-visit resources can encourage visitors to participate in environmentally sustainable actions and enhance their attitudes towards wildlife.

What Influences Visitors’ Long-Term Environmental Learning?

In order to better understand the impact of different variables on environmental learning, Ballantyne et al. (2011) used structural-equation modelling to identify the factors that best predicted positive long-term environmental learning and environmental behaviour change outcomes. Working in four marine-focused educational leisure settings (two where animals were captive – an aquarium and a marine theme park; and two where animals were wild – a whale watching experience and a turtle nesting and hiking experience), they tested the relationships between visitors’ entering attributes, relevant aspects of the experience and short- and long-term learning outcomes. The empirical model examining from their observations and analysis showed that attributes such as pre-visit environmental orientation and motivation to learn were good predictors of the long-term impact of the experience (Fig. 1). Aspects of the experience, particularly the opportunity for reflective engagement, which included both cognitive and affective processing of the experience, were also found to influence both short- and long-term learning. For zoo and aquarium professionals, this suggests that encouraging visitors to reflect, imagine, connect and discuss during their visit is important to encourage long-term behaviour change.

What Do Visitors Want From Their Visit?

Recently, research designed to investigate various aspects of visitor environmental learning was conducted at 13 zoos and aquariums in the USA, UK, Canada and South Africa (Ballantyne & Packer, unpublished data). A total of 1,156 questionnaires were returned from the 13 institutions (705 responses from six zoos and 451 responses from seven aquariums). The findings of this study revealed that zoo and aquarium visitors held predominantly social motives for their visit – wanting to share quality time with family or friends, as has been found in many previous studies. Interestingly, the research revealed that, for most visitors, learning was one of the top three reasons (out of the five options presented) for visiting the facility and that more aquarium visitors were interested in learning than zoo visitors. Zoo and aquarium visitors rated themselves slightly above the midpoint of the scale in terms of their interest and knowledge about the environment. Zoo and aquarium visitors reported their environmental practices, especially recycling, conserving energy and conserving water, to be slightly above the midpoint of the scale. This highlights the fact that zoo and aquarium visitors are generally often already predisposed to hearing about environmental issues. However, when it came to more active environmental contributions, such as participating in public clean-ups or doing volunteer work, visitors rated themselves slightly below the midpoint of the scale. This would suggest that zoos and aquariums have the opportunity to capitalise on the interest of their visitors to encourage more active environmental contributions.

Of importance to zoo and aquarium professionals was the finding that visitors considered that factors relating to animal welfare (animals were well cared for, active and kept in naturalistic environments) contributed most to their satisfaction with their visit, followed by experiential factors (novelty, variety, proximity to animals) and environmental learning factors. Least important to visitors were interaction factors (being able to touch the animals, see them being fed or see them perform). For 75% of visitors, knowing that the facility contributes to animal conservation projects was at least as, if not more, important than being able to see animals being fed. This is a positive finding, as it highlights the synergies between animal welfare and conservation and visitor satisfaction. Investments in animal welfare and conservation should be seen as contributing to visitor satisfaction.
This study also looked at what visitors considered to be the most important role of zoos and aquariums. According to the visitors surveyed, zoos and aquariums should provide information about animals, conservation and environmental issues. Being places where you relax and enjoy the beauty of nature was also considered important by visitors. Overall, 74% of visitors believed that the zoo’s or aquarium’s role in providing information about conservation and environmental issues was at least as, if not more, important than being a place where you can go for a fun experience. The opportunity to reflect and think during a visit was noted, as the majority of visitors felt it was very important for zoos and aquariums to encourage visitors to reflect on and take action in relation to environmental issues.

An investigation into visitors’ preferences for off-site conservation information revealed that almost half of all visitors felt it was very important for zoos and aquariums to provide take-away materials to encourage people to continue learning about environmental issues after their visit. When asked how they would like to continue learning about the animals after their visit, visitors noted that a website that could be accessed from home would be their first choice, followed by information on upcoming TV programmes and talks at the zoo or aquarium. It is noteworthy that visitors were not generally supportive of regular reminder e-mails, text messages, stickers or Facebook groups.

This study also detected a number of significant differences between zoo and aquarium visitors (Fig. 2):

- Aquariums appeared to attract more tourists and first-time visitors than zoos, while zoos were more popular with local residents, many of whom visited more than once a year.
- Aquarium visitors tended to be more environmentally oriented than zoo visitors.
- Aquarium visitors were more likely to hold learning motives than zoo visitors.
- Aquarium visitors placed more importance than zoo visitors on the role of the facility in relation to conservation education.
- Learning or conservation factors contributed more to the satisfaction of aquarium visitors, while opportunities to interact with animals were less important, than for zoo visitors.

Future Research – Some Suggestions

Overall, it would appear that visitors’ views on the role of zoos and aquariums are becoming increasingly congruent with the mission of modern zoos and aquariums. No longer do visitors, or the facilities themselves, want to be only places of entertainment, both consider issues such as animal welfare, education and conservation to be vitally important. The work undertaken by Ballantyne & Packer presents an important step forward in the quest to better understand the visitor to a zoo or aquarium and, more importantly, how best to influence the behaviour of the visitor. The international nature of the research is important, as only one other study has looked at visitor learning across multiple sites and countries (Gusset et al., 2011). However, given the complexity of visitors as well as the wide range of zoos and aquariums around the world, there remains much to be learnt in this field. Key focus areas for research include:

- Better techniques for the measurement of long-term environmental learning after a visit to a zoo or aquarium – this should encompass environmental values, attitudes, knowledge and behaviour.
- How best to reinforce visitors’ environmental learning “off-site” in order to ensure that the visit becomes a part of life-long environmental learning.
- The need to develop a validated tool that can be used by zoos and aquariums to accurately measure visitors’ environmental learning and subsequent environmental behavioural outcomes as a result of a visit.

References

Increasing the Effectiveness of Offsite Behaviour Change Programmes

Introduction

Many readers will be familiar with issues surrounding the production of palm oil. In short, the cutting down of native forests for oil palm plantations is resulting in habitat and biodiversity loss in several countries. To try and effect change, Zoos Victoria has embarked on a multiphase campaign entitled “Don’t Palm Us Off”, which seeks to both raise awareness about the issue of palm oil and galvanise the public into action that reduces future deforestation. Specifically, during early phases of the campaign, visitors to Melbourne Zoo were asked to sign a petition lobbying a government body called Food Standards Australia and New Zealand to mandate labelling of palm oil on all goods containing the product. The idea behind this campaign was to engage visitors in the issue and to use petitions to persuade politicians and others that there is public support for action. Other zoos joined in, adding further weight to the campaign and, although palm oil labelling is not mandatory, it has been successful on many fronts, with all major food manufacturers within Australia committing to source certified sustainable palm oil by 2015 and some offering voluntary labelling.

The palm oil campaign serves as an example of how the collective potential of visitors acting in concert can be unlocked to good effect, and represents one example of an onsite behaviour change campaign that has demonstrated impact. Campaigns targeting onsite pro-wildlife behaviours are common in zoos and the primary reason for their relative success is because visitors are willing and able to pay sufficient attention to issues about wildlife and engage with persuasive content designed to convince them to act. At zoos, most visitors are out of their normal decision-making contexts, where so much behaviour is habituated and automatic, highlighting the genuine opportunity that zoos have to ask people to learn about an issue and do something they would not normally consider. Because of this, influencing behaviour at a zoo is comparatively easy and all zoos ought to be facilitating onsite behaviour wherever possible, especially given that the collective impact of behaviour performed by large numbers of visitors can make a genuine impact on some wildlife issues.

The Spillover Effect and Challenges

The “Don’t Palm Us Off” campaign does not just want visitors to advocate for palm oil labelling. They also want visitors to look at labels in their supermarket and, ideally, choose products that do not contain palm oil (usually identified as vegetable oil and high in saturated fat) or contain certified sustainable palm oil. In other words, they are relying on behaviour “spillover”, where one behaviour acts as a catalyst for another. From several studies we know that behavioural spillover can be effective, but there are some conditions that need to be met. First, of mind. This is where the issue for this particular campaign, and zoos in general, becomes problematic because undesirable offsite behaviours such as choosing products containing palm oil at the supermarket may be highly habituated or at least subject to other decision-making factors at the time of purchase, such as past behaviour, quality and cost. Indeed, this is likely to be the case for many offsite behaviours.

This does not mean giving up on offsite behaviour, since there is greater potential impact on wildlife-related issues when visitors change their behaviour in non-zoo contexts. Indeed, the argument could be made that these behaviours are more important to change. However, in contrast to the success of some onsite behavioural campaigns such as the palm oil campaign, there are relatively few campaigns where offsite success can be seen, or at least has been measured, although requests for offsite behaviour are probably made just as often as requests for onsite behaviour. Studies examining changes in offsite behaviour show that although visitors often leave zoos with a heightened awareness of environmental issues and positive behavioural intentions, only a minority follow through with actual behaviour change (Ballantyne et al. 2010). This has led to a call for structuring the onsite experience to have a greater impact offsite.

Summary

The purpose of this article is not to examine behaviours that are currently being asked of zoo visitors onsite, but rather offer some suggestions about how zoos can be more effective in influencing offsite behaviour in the future. These are not necessarily new ideas, but come from the observation of zoo activities designed to change behaviour, with a focus on choosing behaviour wisely and selecting appropriate tools to facilitate the desired behavioural change.

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Fig. 1
At Zoos Victoria’s “Zoo supermarket”, visitors can scan products to see if these contain palm oil.
© Zoos Victoria

References

A key question is what type of offsite behaviours zoos may be able to influence. Here, the best outcome probably lies, at least in the short term, in changing infrequent unhabituated behaviours. Another campaign run by Zoos Victoria asks visitors to take home a postage-paid mobile phone recycling bag such that when they return home, visitors can place their old mobile phones in the sachet and put them in the post without cost. Taronga Zoo asked visitors to cook a few different recipes with sustainable fish species in the weeks following their visit. These sorts of choices for offsite behaviour are likely to prove more successful in the short term.

Visitors’ preferences can also be taken into consideration. In a study we asked visitors what sorts of behaviours they think the zoo should ask them to do, and why. We found four common features in responses. Visitors liked behavioural requests that were (Smith et al. 2003):

- new or novel (or are based on a new or novel understanding);
- easy (cognitively, physically and financially);
- high in response efficacy (showing a clear cause and effect);
- onsite.

Choosing Behaviour

Some suggestions for how Zoos Could Approach Behaviour Change

Sanctuary was interested in whether the exhibit experience could persuade visitors to choose Forest Stewardship Council (FSC) certified products. To test whether the exhibit was effective, the zoo set up a stand of postcards available for sale in their shop. Two vertically arranged columns with pairs of matching (same picture) postcards were put on a display stand. There were two small differences between the cards on the left and right. The postcards on the left were slightly more expensive and contained a small FSC logo on them. The postcards on the right were cheaper and did not have the logo. Purchasing behaviour was then observed and whenever a card was purchased, visitors were asked if they had been to the postcard exhibit and this was recorded with their purchase type. This ran for a few weeks and then the FSC cards were swapped to the right hand side of the stand. The results of this study show that the exhibit did have an effect. However, the point for citing this example here is to point out that zoos can replicate the types of choices visitors have in reality.

Using Commitments

The palm oil example above is a good example of a commitment strategy that seeks an onsite commitment for offsite behaviour (Fig. 2). The benefits of asking visitors to sign a petition in favour of palm oil labelling achieves more than a long list of names that may be persuasive to the country’s lawmakers. It can also leave an enduring psychological impact on the person who signs. Commitments work best when they are effortful, active (i.e. you choose to do them rather than passive accepting a default) and, perhaps most importantly, public. Given that zoos interested in influencing offsite behaviour are often asking visitors to make a commitment onsite that either explicitly or implicitly will lead to offsite behaviour, it makes sense to explore how commitments made onsite could consider these three ingredients.

Many zoos contain pledges in the forms of leaves, post-it notes and the like that are displayed somewhere at the zoo for other zoo visitors to see (if they take a close look). However, there are other examples where commitments are more public. One of the more innovative of these is at Monterey Bay Aquarium, where a digital camera takes photographs of visitors and the image is placed in a video containing them performing pro-environmental behaviours they have committed to at the Aquarium. This video is then sent to visitors’ e-mail accounts along with easy options to share the video with others. In Ocean Park Hong Kong, visitors can make pledges that appear in video imagery as part of the exhibit. Greater utilisation of these sorts of techniques where commitments are made public will lead to greater change. Zoo websites and members’ newsletters represent opportunities for doing this and are underutilised.

Regardless of the commitment, how zoos use them to foster offsite behaviour needs consideration. A good example of how to link on- and offsite behaviour comes from Taronga Zoo. Visitors were asked to make a commitment to purchasing sustainable seafood during a seal encounter. Once the commitment was made, visitors were recruited into an offsite programme by requesting that they send, during the encounter, an SMS to the zoo containing their e-mail address. Shortly afterwards, visitors were sent an e-mail with links to short videos about marine sustainability issues, a few written points about the issue and some recipe suggestions for sustainable seafood choices. Connecting the onsite experience so explicitly to offsite behaviour and then making the offsite behaviour easier and close in time to the onsite behaviour are all likely to increase the effectiveness of the offsite influence.

Changing Habits

Influencing habituated behaviour is significantly harder. Leading habits researchers Verplanken & Wood (2006) suggest that there are moments in individuals’ lives when habitual behaviours are revisited. Such occasions include moving house, changing jobs, retiring, having children and the like. If such information about visitors’ lives could be gleaned from zoo membership databases or an onsite questionnaire, then the same requests for behaviour change may have greater impact than if delivered to those who are not in moments of change. Some companies are able to identify when you are having a baby based on the purchases you make on store cards, credit cards and the like, allowing them to market products to you before you even know you need them. While such big data and analytics are unlikely to be used by zoos, timing behavioural requests with data they do, or could, collect may present some opportunities. For example, a zoo member notifying the zoo of a change in address could be informed about nearby supermarkets that stock products with certified sustainable palm oil, or where the nearest post box is for dropping off sachets with their old mobile phones.

Replicating Real Choices

While choosing behaviours that meet all these preferences may be difficult, considering how a chosen behaviour fits with them, or using them as criteria when selecting behaviours, could be valuable. One final point on choosing behaviour is that being specific about the behaviour is important. It is much easier to identify and change drivers and barriers for specific behaviours than it is for less well-defined behaviours.

Some zoos are looking to influence onsite behaviour that looks and feels different to offsite behaviour. The new phase of the “Don’t Palm Us Off” campaign has a “Zoopermarket” where visitors can scan products to see if the zoo have agreed to use, certified sustainable palm oil, or where the nearest post box is for dropping off sachets with their old mobile phones.

Some Suggestions for how Zoos Could Approach Behaviour Change

Fig. 2 (Zoos Victoria’s “Don’t Palm Us Off” petition card served not only as a tool for advocacy but also as a tool to capture an individual’s commitment to the cause. © Zoos Victoria)
Another approach to tackling habitual behaviour change is to provide visitors with post-visit action resources. In the seafood example at Taronga Zoo, we were able to show improvements in the purchase of sustainable seafood choices and fewer purchases of unsustainable choices by providing recipes (Smith et al. 2011a). However, while some zoos may be providing post-visit action resources, results are scarce. Research in partnership with four zoos from around the world is currently exploring how zoo websites can be used to greater effect, but more needs to be done.

Facilitating Profundity

One last area worthy of consideration for offsite behaviour change is the provision of profound onsite experiences. When a visitor is truly affected by an experience with wildlife, their lives may indeed be changed in many ways (Smith et al. 2011b). While the occurrence of these experiences is likely to be infrequent, zoos should still strive to facilitate them. Common features in profound wildlife experiences include a number of personal and situational features such as animal features (e.g. number, type and size), proximity and aspects of the setting. Such features are important to zoos as they design their experiences to increase the chance of profundity. However, perhaps the best example of a powerful and life-changing onsite experience comes in the form of programmes designed for visitors to overcome phobias, most notably of spiders and snakes. Such programmes, which run at numerous zoos around the world, represent a truly unique opportunity for zoos to lead to dramatic life change where visitors leave with both a new-found respect for often-maligned species and alternative behavioural options to killing individual animals, which may also afford other benefits to the environment (e.g. less use of pesticides).

Conclusion

The above has reviewed some options for future behaviour change programmes, but the key lesson to impart is that visitors’ offsite behaviour is not beyond reach. There are methods and approaches that zoos are just beginning to utilize and in the future zoos will become better at them and become more powerful behaviour change agents. The initial steps are already there and with momentum building, the zoo of the future is sure to ask its visitors to be a lot more involved than they have done to date.

References


Post-visit Action Resources

We explored the readiness of zoo and aquarium visitors to engage with the issue of global climate change through the Climate Literacy Zoo Education Network (CliZEN). One of CliZEN’s first efforts was to conduct a survey of zoo and aquarium visitors in the USA. This study was designed to investigate visitors’ cognitive, attitudinal and behavioural predispositions towards climate change as well as explore their attitudes and viewpoints regarding wildlife, nature and conservation actions. The results of this national survey allowed us to begin to outline how zoos and aquariums can effectively incorporate visitors’ predispositions and emotional connections with animals into educational resources that inspire actions with a positive impact on mitigating climate change. While this study focused on climate change, these results suggest broad implications for increasing engagement in a variety of pro-environmental efforts, including biodiversity protection and ocean conservation.

Introduction

Zoos and aquariums are well poised to exert a positive influence on millions of visitors towards biodiversity protection and other environmental issues, such as climate change. Yet simply increasing levels of knowledge about environmental problems is insufficient to engage audiences in conservation actions or to meet the conservation and education missions of zoos and aquariums. Based on a large USA climate change survey study, we found that most zoo and aquarium visitors are already highly concerned about climate change. These visitors feel emotional connections with animals and also perceive their visit as a socially supportive context for discussions about nature. The majority of visitors are interested in greater engagement in pro-environmental behaviours, but they also perceive obstacles to engage in these behaviours. These results indicate that zoos and aquariums must support visitors with educational resources that help to overcome perceived obstacles to engagement. The main obstacles include low perceptions of personal impact, pessimism about collective actions and lack of knowledge about effective solutions. Emotional connections with animals, social communications and supportive educational resources can be a powerful combination for engaging zoo and aquarium visitors in environmental solutions.

Summary

Beyond Facts: The Role of Zoos and Aquariums in Effectively Engaging Visitors in Environmental Solutions

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References

Data collection for this study took place in 2011 at ten zoos and five aquariums across the USA. Two independent questionnaire forms were distributed simultaneously (n = 1,382). One form primarily focused on climate change attitudes and experiences at zoos or aquariums and the other form primarily focused on environmental behaviour and perceived obstacles to participation in actions to address climate change. The attitudes questionnaire included items about visitors’ attitudes and viewpoints about global warming, social experiences at the zoo, environmental behaviour predispositions, affective connections to wildlife and nature and concern for animals. This questionnaire was configured to provide direct comparisons with the Global Warming’s Six Americas study (Maibach et al. 2009), which aimed to provide an audience segmentation for attitudes about global warming in the American public. Their study revealed a continuum of six unique audience segments among the American public: alarmed, concerned, cautious, disengaged, doubtful and dismissive. The second form was a behaviours questionnaire that contained items to assess visitors’ current actions in addressing climate change. It also measured visitors’ perceived obstacles to engagement: personal control over addressing climate change, pessimism about collective actions and lack of knowledge about solutions. Details about the questionnaire and results can be found at http://clizen.org/survey.html.

Findings

Most zoo and aquarium visitors are alarmed or concerned about global warming. The proportions of zoo and aquarium visitors in the alarmed and concerned segments were substantially larger than the general American public and included 64% of all zoo and aquarium visitors (Fig. 1). The alarmed and concerned zoo and aquarium visitor segments exhibited the highest composite score of environmental behaviour predispositions; thus, these visitor segments were most likely to spend time in nature, try to help protect habitats, support conservation organisations and engage in daily conservation activities (Kelly et al. 2014).

Visitors’ emotional connections with zoo and aquarium animals are strongly related to their various responses to climate change. Fifty-three percent of visitors reported a moderate or strong sense of connection to zoo and aquarium animals. Their sense of connection with animals was positively correlated with the strength of their conviction that climate change is happening and awareness of the consequences of climate change. We also found a positive association between visitors’ sense of connection with animals and their concern about the effects of climate change, perceptions of being able to personally address climate change and participation in pro-environmental behaviours (Clayton et al. 2014).

Visitors perceive zoos and aquariums as socially supportive contexts for discussions about nature. Zoo and aquarium visitors from all audience segments highly rated their enjoyment discussing zoo and aquarium exhibits displays. All segments also had moderate to high ratings for the degree to which they use zoo or aquarium visits as a chance to talk with friends and family about their relationship to nature (Kelly et al. 2014).

Visitors’ emotional connections with zoo and aquarium animals are strongly related to their various responses to climate change. Fifty-three percent of visitors reported a moderate or strong sense of connection to zoo and aquarium animals. Their sense of connection with animals was positively correlated with the strength of their conviction that climate change is happening and awareness of the consequences of climate change. We also found a positive association between visitors’ sense of connection with animals and their concern about the effects of climate change, perceptions of being able to personally address climate change and participation in pro-environmental behaviours (Clayton et al. 2014).

Visitors want to do more to address climate change, yet perceive obstacles to engaging in mitigation behaviours. The vast majority of zoo and aquarium visitors acknowledged the human role in contributing to climate change; nearly two-thirds agreed that it is caused mostly by human activities. Furthermore, 56% of zoo and aquarium visitors also wished to personally do more to address climate change. However, visitors perceived significant obstacles to engagement in climate change mitigation behaviours. These obstacles can be classified into three types:

- Perception of low personal impact. Only approximately half of zoo and aquarium visitors reported a belief that they can personally have a fair amount or a great deal of impact on addressing climate change.
- Pessimism. Thirty percent of zoo and aquarium visitors felt that although human action can reduce the effects of climate change, people in general are not willing to change their behaviour. Another 50% of visitors were uncertain as to whether or not people in general will do what is needed to address climate change.
- Lack of knowledge about solutions. Zoo and aquarium visitors reported lack of knowledge about effective and affordable actions to address climate change.

Overall, 92% of respondents selected at least one barrier.

Fig. 1

Proportions of the general American public (May 2011; Leiserowitz et al. 2012) and zoo and aquarium visitors (summer 2011) in each “Six Americas” segment (proportions represented by width of bubbles).

Fig. 2

Sixty-nine percent of zoo and aquarium visitors reported a desire to do more to address climate change. Of those, respondents were asked to select what, if anything, was standing in their way of doing more to address climate change.

Overall, 93% of respondents selected at least one barrier.

- Perception of low personal impact.
- Pessimism.
- Lack of knowledge about solutions.
Inspiring Ocean Conservation at Monterey Bay Aquarium: Using Visitor Research to Measure Impact

Summary

The mission of Monterey Bay Aquarium is to inspire conservation of the oceans. From 2006 to 2008, Aquarium staff members and consultants conducted a series of evaluation studies to assess the extent to which visiting the Aquarium inspired visitors to learn more, care more and do more for the oceans. The Inspiring Ocean Conservation (IOC) Project showed that the vast majority of visitors who participated in these studies were inspired by their visit. In addition, many visitors translated their Aquarium experience into personal intentions and actions that persisted for months following their visit. Conservation outcomes were strongest for visitors who were conservation-oriented when they arrived at the Aquarium, stopped at more of the designated conservation exhibits, attended certain programs, spoke with an interpreter about conservation or took home a printed guide on how to choose ocean-friendly seafood. Interesting findings emerged with respect to how different types of visitors carried out their visits, which varied according to individuals’ characteristics, backgrounds and interests. The project also documented how crowding in the exhibition galleries during busy periods diminished visitor outcomes. These findings have important implications for the Aquarium and for other aquariums and zoos that promote environmental conservation.

Introduction

Over the last century, as aquariums and zoos have evolved from menageries to conservation centres (Rabb 2004), their missions have evolved as well. To assess the effectiveness of their missions, aquariums and zoos have begun to undertake research studies to determine their impact on visitors’ knowledge, feelings, attitudes and behaviours towards wildlife and the environment (Falk et al. 2008).

In 2006, Monterey Bay Aquarium (Fig. 1) initiated a project to determine the extent to which the organisation was achieving its mission to inspire conservation of the oceans through its onsite visitor experience. The purpose of this multi-year, outcome-based evaluation was to define and measure the ways in which visiting the Aquarium inspired visitors to become more interested in, knowledgeable of and concerned about ocean conservation and to want to engage in conservation actions during their visit to the Aquarium and at home.

Throughout its 30-year history, the Aquarium has experimented with many different strategies to inspire visitors, including staging special exhibitions and programmes about conservation issues; creating a consumer guide to ocean-friendly seafood; installing labels, videos and interactive displays about conservation throughout its permanent galleries; launching visitor-supported advocacy campaigns; and training staff and volunteer interpreters to initiate informal conversations about conservation with visitors (Ramberg et al. 2002). Although the Aquarium had evaluated some of these strategies on a case-by-case basis over the years, it had never explored the impact of an entire visit (Yalowitz 2004). In 2006, a team of staff members and consultants began to address this challenge by launching the Inspiring Ocean Conservation (IOC) Project (Vernon et al. 2012).

Acknowledgements

Finally, our findings indicate that in order to increase engagement in environmental solutions, zoos and aquariums should effectively utilise their living animals and interpretive displays in ways that go beyond merely explaining scientific facts or environmental problems. The sense of connection that visitors have with animals is associated with not only awareness of the effects of climate change, but also concern, perception of personal impact and participation in pro-environmental behaviours.

Zoos and aquariums, therefore, should focus on amplification of visitors’ mindfulness of their sense of connection with the natural environment. Access to animals and interpretive exhibits is unique to zoos and aquariums. Our findings reveal an expansive potential for leveraging these resources towards building communities with the capacity and confidence to engage in effective biodiversity and environmental solutions.

References


at large, including current level of engagement in environmental behaviours and concern for animals (also see Kelly et al. 2014). Raising visitors’ engagement in environmental issues should avoid simplistic prescriptive solutions (e.g. “the top ten things to change the planet”), and instead should focus on overcoming obstacles by recognising the opportunities for social interactions that create dialogue around solutions. Such dialogue should focus on increasing confidence in the potential for personal impact, alleviating pessimism about collective actions and increasing knowledge about cost, time and level of difficulty of various effective actions.

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Project Description

The IOC Project set out to examine the relationship between visitors’ individual characteristics, interests and backgrounds; their experiences while visiting the Aquarium; and their post-visit experiences back at home. With the help of staff from across the Aquarium, we identified a number of outcomes that we hoped visitors were experiencing before, during and after their visit.

For example, we hoped that visitors would be excited about their Aquarium visit and know what to expect before they arrived, to be aware of ocean conservation issues, to increase their knowledge about ocean life, to become more aware of ocean conservation issues, to take action on an issue at one of our designated conservation exhibits (Fig. 2) and to leave the Aquarium with a book, a brochure, personal photos or a meaningful souvenir that would remind them of their visit after they returned home. In the days, weeks and months following their visit, we expected them to continue feeling inspired by their visit, to continue to learn about topics related to their visit, to take at least one personal action on behalf of the oceans and to become part of the Aquarium’s growing online constituency.

Evaluation Studies

Phase I: front-end interviews (2006). During the project’s initial phase, we conducted in-depth interviews with a sample of about 50 visitors before and after their visit to better understand their pre-visit experiences as well as what occurred during their visit. The findings helped us create a logic model that identified the outcomes we were most interested in studying, along with factors that might possibly influence these outcomes. We also reviewed the relevant literature to better understand how and why changes in visitors’ knowledge, feelings, attitudes and behaviours might occur as a result of visiting the Aquarium.

Phase II: onsite exit surveys (2006). During the second phase, we distributed a lengthy questionnaire to a self-selected subset of about 300 visitors as they were exiting the Aquarium to assess the outcomes that emerged immediately following their visit and the factors that were associated with these outcomes. Many of the items on the questionnaire asked visitors to reflect on how they would have answered a specific question prior to their visit and how they would answer the same question at the end of their visit. The questionnaire featured a mix of open-ended and closed-ended questions to assess each of the outcome areas. Key outcomes were scored using a seven-point rating scale. For example, visitors were asked to rate themselves on the following items:

- I have a good understanding of the problems facing the oceans.
- There are small steps I can take today to help conserve the oceans.
- I’m personally very concerned about the state of the oceans.

Phase III: post-visit observational study (2007). During the third phase, we conducted an online survey with a self-selected subset of about 300 visitors who had completed the onsite exit survey six to seven months prior. The goal was to see if the outcomes the respondents reported immediately following their visit had changed since they left the Aquarium and what post-visit factors might relate to these changes.

Phase IV: whole-visit observational study (2008). During the final phase, we timed and tracked a sample of about 100 visitors throughout their entire Aquarium visit and interviewed them in depth before and afterwards. These visitors also completed a written questionnaire at the end of their visit that was similar to the onsite exit survey administered during the second phase. Although we did not initially plan to conduct this study, we realised midway through the project that we needed to know exactly what visitors were experiencing during their visit to determine if these experiences related to their self-reported outcomes. Surveying visitors at the end of their visit did not provide us with enough accuracy or detail; we needed to observe them in action.

Key Findings

Visitors expressed strong interest in learning about conservation. Visitors were very receptive to the level of conservation interpretation present in the Aquarium’s programmes and exhibits. About 80% of visitors felt the amount of interpretation was “just right”; a small percentage (14%) felt it was “too much”, and about one-fifth felt there was “not enough”. Social interaction between visitors and their companions, or between visitors and the Aquarium’s interpreters, was related to stronger outcomes. For example, about one-half of the visitors in the whole-visit study reported talking to others in their group about conservation issues, while about one-fifth of them spoke with a volunteer or staff interpreter about conservation. All these visitors reported stronger intentions to take action following their visit.
Visitors’ experiences during their visit

Visitors’ interests and backgrounds influenced how they conducted their visits. A majority of visitors had personal hobbies, interests or employment that related to visiting the Aquarium (e.g., teachers, photographers, fishermen, scuba divers). In turn, these interests related to how visitors conducted their visits and the outcomes they achieved. For example, these visitors spent more time during their visit and stopped at more of the designated conservation exhibits than other visitors did. They also had higher post-visit ratings for visitors’ intentions to take action. The most common post-visit conservation action voiced by visitors after they left the Aquarium involved making more sustainable seafood choices using the information they gained from the Aquarium’s Seafood Watch pocket guide – a printed handout with information about how to buy ocean-friendly seafood. However, visitors’ intentions to engage in conservation activities tended to erode over time, especially when their behaviours were not reinforced.

For example, about one-third of online survey respondents said they had not done anything new or different to conserve the oceans since leaving the Aquarium. When asked why, about one-quarter of them said they did not have an opportunity to do anything, while another one-quarter said they had other priorities in their lives. In addition, nearly one-fifth of them said they were not sure what they were supposed to be doing differently.

Crowding prevented some visitors from achieving the desired outcomes. During the whole-visit study, about one-third of visitors identified one or more problems they had encountered during their visit, with the most common complaint being crowding. Crowding not only interfered with visitors’ enjoyment, it also diminished their conservation outcomes. For example, visitors who complained about crowding were less inspired to conserve the oceans and performed fewer conservation actions after their visit; they also had lower levels of concern about the oceans as well as less knowledge of what they could do to help conserve the oceans.

**Implications for Aquariums and Zoos**

The IOC Project demonstrated that aquariums and zoos have the potential to inspire visitors and reinforce their attitudes, knowledge and awareness about conservation issues as well as their behaviours and intentions to act. However, visitors’ differing characteristics, beliefs, interests and backgrounds also play a role in shaping these outcomes, as do their pre- and post-visit activities and experiences. As a result, aquariums and zoos would do well to view the visitor experience along a continuum that focuses on visitors’ conservation outcomes before, during and after their visit.

For example, the IOC Project found that while most visitors to the Aquarium felt inspired during their visit, some of their conservation outcomes diminished after they returned home. As a result, the Aquarium has worked to expand opportunities for visitors to immediately engage in conservation actions during their visit and to stay connected with the Aquarium after they return home through take-home conservation guides, e-newsletters and other strategies.

Another important finding was that conversations about conservation between visitors and Aquarium interpreters or between visitors and their companions were strongly related to the outcomes visitors reported. As a result, aquariums and zoos should try to increase the number and quality of conversations that take place about conservation onsite. While it may seem obvious, the interpreters’ ability to tailor conversations and messages may have encouraged visitors to either start or continue specific conservation behaviours.

One factor that has changed greatly since the IOC Project was conducted is the prevalence of social media, which the Aquarium now uses to engage visitors in conservation-related activities. Online tools could be used to an even greater degree, providing immediate opportunities for visitors to join a community, take action or become engaged with a conservation issue over time.

**Conclusions**

This year marks Monterey Bay Aquarium’s 30th anniversary. To date, more than 50 million visitors have toured our exhibitions and experienced our programmes. The IOC Project confirmed that the vast majority of these visitors leave the Aquarium at the end of the day with a strong desire to help conserve the oceans. However, the project also highlighted steps the Aquarium could take to increase its impact, such as training interpreters how to engage visitors more effectively on conservation issues, providing more opportunities for visitors to take immediate action during their visit, acknowledging and supporting visitors’ personal actions at home and reducing the effects of crowding in the exhibition galleries. Through these and other measures, the Aquarium will continue to refine its strategies to inspire the next generation of visitors yet to come.

**Acknowledgements**

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**References**

Conservation Education Impact Research at SeaWorld Parks

Summary

SeaWorld Parks and Entertainment commissioned research both to assess the conservation education impacts that accrue from visits to the three SeaWorld parks and Busch Gardens Tampa and to better identify the unique psychographic profiles of its visitors to better design its message and messaging to have the greatest conservation impact. The research identified six dominant psychographic profiles of its visitors that are consistent for the parks: animal enthusiasts, social connectors, living world explorers, adrenaline junkies, fun for all and adult fun time. Across all types of visitors, there is some degree of increase in overall conservation values, but the type of increase varied according to their motivation, with some minor variation based on age or income. Understanding the psychographic profiles and motivations of our guests has led to stronger planning of “Antarctica: Empire of the Penguin”, a state-of-the-art penguin exhibit and experience.

Introduction

The role of zoological institutions, especially large theme parks, as environmental education providers has recently been questioned, in part due to a lack of comparative publicly available data on long-term outcomes resulting from these experiences. Traditionally, free-choice learning organisations have relied on demographic data to describe and categorise those who visit (Falk & Dierking 2002). Narratives have described visitors as arriving at any museum or cultural attraction with prior knowledge, experience, interest and motivations that influence the outcomes from their visit. Over the next several years, it will be imperative that zoological facilities increase the amount of research focused on learning in our zoological settings and have that research published in peer-reviewed journals.

SeaWorld Parks and Entertainment (SEA) commissioned research both to assess the conservation education impacts that accrue from visits to the three SeaWorld parks and Busch Gardens Tampa and to better identify the unique psychographic profiles of its visitors to better design its experiences and messaging to have the greatest conservation impact. John Fraser from New Knowledge Organization led this research programme. Our evaluation approach acknowledged the unique characteristics of SEA parks and hypothesised that, although they are in some ways comparable to other non-profit local zoos and aquariums, there may be significant differences.

We recognised that people have different psychological, cultural and political reasons for visiting paid attractions such as SEA, and that the effectiveness of our conservation communications and efforts are impacted by these differences. Falk et al. (2008) have demonstrated that zoo and aquarium visitors have five unique and dominant entrance narratives that motivate their visits. However, motivations alone do not contribute to learning outcomes. It has been demonstrated that learning outcomes are also coloured by how the zoo or aquarium is perceived as an authority on any given environmental topic (Fraser & Sickle 2009), the species that is exhibited (Fraser et al. 2006) and the extent to which the experience impacts subconscious connections to nature (Bruni et al. 2008). The study used a three-part sequential approach to answer these questions. The process was initiated with data mining and analysis of focus group data previously collected by the SEA marketing teams, followed by intercept surveys in the parks and eight focus groups conducted onsite with SeaWorld and Busch Gardens visitors, and conclud-ed with a national quantitative survey of park visitors.

Conservation outcomes and those who claim to be conservation minded and atti-tudes, and appear more attentive to and supportive of the education programmes offered by SEA staff. These visitors are also likely to support more overt discussion of SEA efforts in conservation and are equally likely to increase their favourable perceptions of the organisation if they become aware of these efforts. Data collected through this study demonstrate that experiences at the SEA parks result in overall perceived increases in conservation values and knowledge for visitors. The psychographic profiles identified offer an insight into the degree of change and the motivations that support that change. This was evident even in those least likely to describe increases in conservation outcomes and those who claim to be most resistant to the educational messaging; they still reported an increase in some dimensions of conservation outcomes.

Focus Groups

The focus groups indicated that most participants saw an obvious and necessary link between SEA and conservation efforts because of the presence of exotic and/or endangered animals in the parks. These efforts were welcomed but identified as not well advertised. Most participants welcomed additional efforts and messages as long as there was a choice in receiving them. Long-term pass holders, or those who frequented the parks, even identified the company’s conservation efforts as their own, viewing a link between their membership and their identity as a supporter of conservation.

Education efforts were considered integral to the mission of the parks and as contributing to positive and lasting impact on guests. More interaction with staff, better advertising of these opportunities and clearly defined roles and responsibilities for staff in animal areas were suggested from all visitor segments. Guests across visitor segments, even those more interested in rides, expressed interest in learning more about the animals in the parks. The parks were considered by all participants as trustworthy sources of information.

Results of the survey indicated that all parks attract some visitors who are already conservation minded and have altruistic views about protecting wildlife and nature. Those more conservation-minded visitors are more likely to report increases in their conservation knowledge and attitudes, and appear more attentive to and supportive of the educational programmes offered by SEA staff. These visitors are also likely to support more overt discussion of SEA efforts in conservation and are equally likely to increase their favourable perceptions of the organisation if they become aware of these efforts. Data collected through this study demonstrate that experiences at the SEA parks result in overall perceived increases in conservation values and knowledge for visitors. The psychographic profiles identified offer an insight into the degree of change and the motivations that support that change. This was evident even in those least likely to describe increases in conservation outcomes and those who claim to be most resistant to the educational messaging; they still reported an increase in some dimensions of conservation outcomes.
Psychographic Profiles in the Segmentation Study

The research identified six dominant psychographic profiles for visitors that are consistent for the SeaWorld parks and Busch Gardens Tampa. Across all types of visitors, there is some degree of increase in overall conservation values, but the type of increase varied according to their motivation, with some minor variation based on age or income.

Animal enthusiasts (36%). This group visits the SEA parks to observe how the animals and exhibits change over time. Animal enthusiasts are most likely to work in the garden, contribute to an environmental or conservation organisation, visit zoos, aquariums and national parks, and participate in other activities such as camping, snorkelling and scuba diving. Animal enthusiasts worry a lot about the effects of environmental pollution and report making a strong effort to recycle. They are highly engaged environmentalists who would be willing to pay more for a product with natural ingredients or to buy from companies that support charitable causes. Although they reported increased commitment to protect the environment and wildlife, they did not report much more empathy with animals and habitats after their visit. They are also less likely to agree that SEA is a place that provides information on how we can help protect and conserve the environment, but they are more likely to agree that this leads to helping others to protect the environment. However, a majority of adrenaline junkies visited the age of 25 do not view SEA as valuable information source for wildlife conservation and protection, restoring and cleaning up habitats and ecosystems, ocean conservation, pollution or water and energy conservation in homes. However, a majority of adrenaline junkies over the age of 25 recognised SEA as a source of information on how to protect and conserve the environment, and many expressed that they developed more empathy with animals after their visit.

Social connectors (36%). This group comprised the greatest percentage of SEA park visitors. Social connectors strongly believe that SEA parks play an important part in a child’s life to get out and enjoy nature and that nature experiences are an important part of childhood. They strongly agree that SEA provides information on conservation efforts and value SEA for educating individuals about animals and habitats. Social connectors value experiences that encourage reflection and the ability to make them more knowledgeable and interested about environmental issues.

Living world explorers (27%). Living world explorers view SEA parks as a place where they can appreciate and experience nature and living animals, develop care for nature and spend time with family or friends in a nature environment. They love nature and a visit to SEA parks provides a better understanding of nature conservation issues and renews their commitment to protect the environment and wildlife. Living world explorers strongly support causes that are concerned with wildlife and make a special effort to buy from businesses that are environmentally conscious. They also place greater importance on zoological activities than most other profiles.

Adrenaline junkies (20%). Adrenaline junkies do not visit SEA parks to relax, learn or change their perspectives on conservation; instead they are drawn to the rides and socialise with friends (Fig. 1). Adrenaline junkies are least likely to make an effort to recycle or be willing to pay more for a product with all natural ingredients. They are also not likely to make a special effort to buy from businesses that are environmentally conscious or buy from companies that support charitable causes. Adrenaline junkies are least likely to work in a garden, visit a zoo, aquarium or national park, or contribute to an environmental or conservation organisation. However, there is a distinct divide within this profile. Adrenaline junkies under the age of 25 do not view SEA as valuable for educating individuals about animals and habitats, as a valuable information source for wildlife conservation and protection, restoring and cleaning up habitats and ecosystems, ocean conservation, pollution or water and energy conservation in homes. However, a majority of adrenaline junkies that are environmentally conscious companies or make a special effort to buy from companies that support charitable causes. They visit zoos and aquariums less frequently and are less likely to contribute to an environmental or conservation organisation. Likewise, they are less likely to recognise the importance of marine life park and aquarium activities, such as promoting environmental conservation, help species in the wild by studying their biology and physiology and fund research projects that help marine mammals. Members of this group agree that SEA is valuable for educating individuals about animals and habitats; however, they are less likely to agree that this leads to helping children learn and explore the natural world. They also believe that SEA is a place that provides information on ways to protect the environment, but are less likely to agree that SEA is a valuable information source for restoring and cleaning habitats, global climate change or pollution.

Adult fun time (14%). Members of this group view SEA parks as a place to relax and to find a spiritual connection with nature. They are not interested in recycling and do not seem concerned about the effects of pollution. They are less willing to pay more for an organic product, buy from environmentally conscious companies or make a special effort to buy from companies that support charitable causes. They visit zoos and aquariums less frequently and are less likely to contribute to an environmental or conservation organisation. Likewise, they are less likely to recognise the importance of marine life park and aquarium activities, such as promoting environmental conservation, help species in the wild by studying their biology and physiology and fund research projects that help marine mammals. Members of this group agree that SEA is valuable for educating individuals about animals and habitats; however, they are less likely to agree that this leads to helping children learn and explore the natural world. They also believe that SEA is a place that provides information on how we can help protect the environment and should offer explicit direction on conservation efforts. Members of this group did not express a strong feeling towards nature experiences being an important part of childhood. SEA is a place where they can find a spiritual connection with nature, but they do not necessarily come to restore their connection with the natural world or to experience and appreciate nature and living animals. Interestingly, a visit to SEA parks did not elicit more commitment to protect the environment and wildlife, or help to develop more empathy with animals. Members of this group looked to SEA to “handle” conservation and environmental education issues, thus removing them from personal responsibility and accountability.
Impact on Exhibit Design

Understanding the psychographic profiles and motivations of our guests has led to stronger planning of our newest zoological attractions. In 2013, SeaWorld in Orlando, FL opened “Antarctica: Empire of the Penguin”, a state-of-the-art penguin exhibit and experience. With the knowledge provided through this research, SEA designed elements of this new attraction for many of these audience types:

• Animal enthusiasts: Aviculturists are stationed in the exhibit to answer questions and provide insight to specific animals within the habitat (Fig. 2). Areas were designed so that aviculturists can access the exhibit at any time to provide unique insight to particular penguins and to engage frequent visitors in a more engaging way.

• Social connectors: This audience responds well to the entire diversity of offerings in the exhibit, from dining and shopping, the ride element, the animal experience and the interactives located throughout the area. Social connectors often consist of families with mixed ages, so making sure that the exhibit had elements for a wide range of ages was important to connect with this audience.

• Living world explorers: Large viewing panels with balconies and rest-areas are found at the end of the exhibit. This audience is known to spend long periods of time just observing animals and making connections, so this viewing area provides the opportunity to do so.

• Adrenaline junkies: The introductory, trackless ride provides both a context to the penguin colony and a thrill component for this audience. Riders can choose the most extreme ride element and each experience is different.

References


Summary

In order to make informed changes to the delivery of education programmes at Melbourne Zoo, research was conducted to help determine the learning outcomes against two different learning models for our early years students (aged 4–7 years) and our middle years students (aged 10–14 years). Research into the early years programme found that an outdoor learning environment can influence nature appreciation in students, and chaperones are key to students achieving learning outcomes. The middle years research project showed that individual, student-centred and directed learning aids in increasing engagement and learning outcomes, as did the concept of whole-day learning in contrast to the traditional 45 min education session. These findings will influence the overhaul of education delivery at Zoos Victoria to ensure that the delivery of education programmes is effective in achieving both the conservation outcomes of the organisation and the learning and development outcomes for the 160,000 students who visit our three zoos each year.

Introduction

Zoos Victoria’s core business is 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 by decreasing human threats by engaging and empowering visitors, including students, to take action to help save wildlife.

Melbourne Zoo has been delivering education programmes to school students since 1969. The manner in which education has been presented to students in 45 years has not varied greatly during that time. The students’ educational experience at Zoos Victoria is influenced by current western education modelling; an indoor 45 min lesson that replicates a physical learning environment familiar to both students and teachers. Zoos Victoria is embarking on changes to the way education programmes are delivered in an attempt to embrace the alternative learning environment that a zoo presents to students. Through this research we hope that changes will see an increase in student engagement, learning outcomes and capacity to help fight the extinction of species now and into the future.

Zoos Victoria’s current school visitation gives us the opportunity to connect with Melbourne’s tertiary students to examine how they perceive and make meaning of the behaviour of a significant proportion of young Victorians. Through this research it has become evident that we require a multi-faceted approach to education to better utilise the physical environment, which will influence a change in pedagogy. This change will be underpinned onsite by a change in the way educators perceive and deliver learning experiences, allowing us to grow, develop and shift from a great zoo education service for schools to becoming a world-leading zoo-based conservation education provider for schools.

Students represent approximately 8% of Zoos Victoria’s (Melbourne Zoo, Healesville Sanctuary and Werribee Open Range Zoo) overall visitation. However, this figure underestimates the significance of student visitors as a zoo audience, as they can represent over 50% of weekday visitors. Very little research has been conducted in this sector of Zoos Victoria visitation. In 2013, to test the need for change in the delivery of learning programmes, Zoos Victoria commissioned research by tertiary students to examine how early childhood (aged 4–7 years) and middle years (aged 10–14 years) school groups currently learn at and use Melbourne Zoo, and compared results to the trial of a new alternative delivery model that incorporated all-day learning and outdoor, less-structured learning activities. The models were assessed on their effectiveness in achieving conservation and learning outcomes (Livermore 2013).
Research into Early Years Education at Melbourne Zoo

Young children gain the necessary foundation for future conservation action through nature appreciation. We understand that messages regarding the current state of the environment – and, in the case of zoos, the extinction of wildlife – can be especially damaging to this age group (Sobel 1995). This research assessed the effectiveness of a new-style education programme in instilling an appreciation for nature, whilst identifying factors that influence learning capacity of students during an excursion to Melbourne Zoo (Fig. 1). Data were collected through interviews with zoo educators and teachers, student observations and testing, and chaperone and parent surveys. Three key findings emerged from the research (Andrade et al. 2013), which inspired the new early years programme:

• Chaperones are an important part of a zoo visit and influence student learning outcomes.
• Early years students require facilitated learning experiences.
• Early years teachers require structure to their day.

Chaperones are influential in achieving student learning outcomes. Zoo educators believe that chaperones can be the key element to learning and engagement of students during a zoo visit. This finding contradicts the manner in which traditional lessons at Melbourne Zoo are delivered, which generally omits parents, additional supervising teachers and chaperones from participating due to lack of space and the preconception that their presence could negatively interfere with the educator-led session. The education session also allows chaperones the opportunity to enjoy a break from the supervision and responsibility of students. By offering this “break”, we are effectively removing chaperones from sharing the education component of the day with their children and those students whom they are responsible for throughout the day.

Parents who attend zoos are a primary example of facilitators of learning (Falk et al. 2007), but the chaperones interviewed failed to recognise their significance as an educator to students. Less than half of the respondents expected their child would learn during the visit and a majority of chaperones were totally unaware of their importance in aiding student learning whilst visiting Melbourne Zoo.

Early years students require facilitated learning experiences. The learning in the alternative early years model required greater facilitation compared to that of the alternative middle years programme. With detailed guidance at a range of learning activities designed with the intention of connecting children with the environment and the animals within them. Side-by-side learning of adults and students invited chaperones into the education space to learn alongside students and play a directive role in student learning. Educators were still perceived as experts who were able to impart knowledge and the research identified that access to these individuals was an important part of the learning experience for teachers, chaperones and students.

Early years teachers want structure. When organising excursions, teachers are under pressure to ensure that students are safe, have time and a space to eat, visit bathrooms, be punctual to education sessions, achieve education outcomes and facilitate learning. The early years trial found that teacher needs featured as a key element to a successful education visit to Melbourne Zoo. Teacher interviews revealed their desire for daily activity structure on an education visit to Melbourne Zoo, highlighting specifically the need for minimal travel time to education session locations, allowing for more time in zoo grounds. Observations of these groups revealed that even though education sessions in the alternative learning model were advertised as a “drop in”, teachers arrived at the beginning of the identified drop-in period and left at the close of the session, exposing their desire to follow a regimented timetable rather than the flexibility on offer with regards to student learning opportunities.

Overall, the research showed that there was a small to medium, statistically significant increase in the positive appreciation of nature in early years students who participated in the alternative model of delivery compared to those students participating in the traditional model. Students were deemed to be self-directed in their learning only 80% of the time.

Student self-direction. The level of self-directed learning was measured in all student groups participating in the research. Students were deemed to be self-directed in their learning if they went out of their way to read animal signs, asked questions to zoo staff or were actively involved at the five ambassador animal exhibits. The level of self-directed behaviour displayed by students was significantly higher in groups that were not experiencing a 45 min educator-led education session. These students were self-directed in their learning only 15% of the time compared to students that experienced a whole-day programme, which showed 65% of the students being self-directed.
Motivating Wildlife Conservation Actions among Zoo Visitors: A Case for Anthropomorphism in Zoos

Introduction

Traditionally, zoos have aimed to (1) conduct and communicate research about animals in a manner that portrays species truly to their character and (2) provide an enjoyable educational experience for visitors. With the World Zoo and Aquarium Conservation Strategy emerging as a third objective: to foster wildlife conservation actions among visitors. Thus, zoos were faced with a challenge: in a one-off zoo visit, what can zoos do to motivate visitors to take wildlife conservation actions?

Flagship Species

Zoos could achieve this objective by designing communication strategies that use the charismatic species from their collections as flagship species. flagship species are those popular charismatic animals that attract public attention and heightens concern for the species (Smith & Sutton 2008). Therefore, the efficacy of any flagship species communication intervention could be enhanced to the extent that it is able to maximise feelings of concern for the species.

References


Summary

The World Zoo and Aquarium Conservation Strategy created a challenge for zoos to find ways to motivate visitors to engage in wildlife conservation actions. One strategy that zoos are uniquely suited to capitalise on is the use of charismatic wildlife species. When a communication intervention clearly links a charismatic species to a desired conservation action in a way that evokes concern for the species, a person is more likely to take actions to help conserve that species. Heightening concern through such an approach can occur when the species is well-known, well-liked and perceived to be similar to humans in some way. Perceptions of these factors can be enhanced through anthropomorphism (i.e. the attribution of human characteristics to non-human entities). After creating the argument that anthropomorphism may be an effective tool to promote wildlife conservation actions, this article discus the application of anthropomorphism in a zoo setting and concludes by providing recommendations for how a zoo might go about incorporating anthropomorphism into its communication strategies.

Fig 1

The relationship between flagship species and wildlife conservation actions.
Flagship species can influence concern in at least three ways. First, because flagship species are well known and well liked, people are more inclined to be concerned and willing to take actions to save them (cf. Gunnthorsdottir 2011). Second, flagship species focus public attention on the needs of a single species and, in some cases, the needs of an individual of that species. This eliminates the need to teach complex concepts about collective needs for things like ‘ecosystem’ or ‘biodiversity’. People are more likely to develop concern and provide greater assistance for animals when their needs are being highlighted in this focused way (cf. Slovic 2007). Charismatic flagship species naturally draw on their likability and capacity for focusing attention on the needs of one species or individual, which creates a greater likelihood for conservation actions.

Third, the persuasive potential of a flagship species can be further amplified based on how it is portrayed. A person is more apt to care about an animal or issue when they can relate to it. Relatability can come from finding similarities with the animal (Plous 1993). By identifying with an animal through similarities, a person may award the animal (1) a human physical characteristics (e.g. walking upright), cognitive states (e.g. intentionality or moral- ity), emotions (e.g. love) or even personality traits (e.g. kindness). Animals can be put in human cultural situations, such as dressing in clothes, going to work or playing sports. 

• Type. There are a variety of types of human characteristics that can be attributed to an animal. For example, a person could attribute human physical characteristics (e.g. walking upright), cognitive states (e.g. intentionality or moral- ity), emotions (e.g. love) or even personality traits (e.g. kindness). Animals can be put in human cultural situations, such as dressing in clothes, going to work or playing sports.

• Intensity. The degree of anthropomorphism can vary from slight to extreme (Fig. 2).

• Communication medium. Attributions can appear visually (e.g. Fig. 2) or through human language – spoken or written.

Any combination of anthropomorphism types, intensity and communication medium acts to blur the perceived boundaries between human and animal. These blurred boundaries are the very basis for how concern can develop. To the extent that anthropomorphism can be used as a tool to heighten perceptions of similarity and relatability with an animal, anthropomorphising a charismatic flagship species may be an effective tool for zoos to achieve their objective of motivating visitors to engage in wildlife conservation behaviours.

Applying Anthropomorphism in a Zoo Setting
Conceptually, anthropomorphism may be a great tool to motivate conservation actions, but is it appropriate to use in a zoo setting, and if so, how might zoos employ it?

Aligning Anthropomorphism and Zoo Objectives
One way to explore the appropriate- ness of applying anthropomorphism in a zoo setting is to evaluate how its use would align with other zoo objectives. Zoos generally aim to conduct and communicate research about animals in a way that remains true to the species. These ideals stem from a Cartesian view of science that to truly understand animals, they are to be viewed objectively and as distinct from humans. Consequently, anthropomorphism may be viewed as inappropriate in these types of scientific inquiries. However, when the objective is to heighten visitors’ sense of connection with an animal to promote concern and actions for it, anthropomorphism could be a valuable tool. While it may seem as though these two objectives are conflicting, there are ways to apply anthropomor- phism while representing the species true to its character.

One strategy would be to identify and promote those naturally occurring, species-specific characteristics that are already human-like. For example, penguins walk upright and kangaroos can eat with their “hands”. There is an ever-growing body of research providing species-specific evidence of elements akin to human cognition, emotionality and even cultural behaviours in other areas of the animal kingdom. By identifying and promoting such naturally occurring human-like traits, mild anthropomor- phic attributions can be made in ways that not only portrays the essence of the species but also heightens perceptions of similarity and relatability.

Another objective of zoos is to create an enjoyable experience for their visitors. Anthropomorphism is commonly used in contexts designed for entertainment or enjoyment. It is popular in children’s books, on television and in feature films. One of the key attractions at places like Walt Disney World is the opportunity to meet various anthropomorphised characters. Anthropomorphism has a long history of being used in the entertainment industry as a way to create relatable characters that attract audiences, suggesting that anthropomorphism can align with zoo objectives for creating fun experiences.

There are several points to consider when designing a strategic communication intervention using anthropomorphised flagship species to promote concern and conservation action among visitors.

Target audience. Any communica- tion intervention will be uniquely perceived by people with differing backgrounds, experiences, socio-eco- nomic status and other demographic variables. The more diverse the target audience, the higher the probability that the message will be inconsist- ently interpreted. It is important to ensure that the target audience is perceiving and responding to the anthropomorphised communication in the intended way. Understanding the intended target audience and tailoring the message to appeal to that specific audience will enhance its likelihood for success.

Practical Considerations
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(2) Species choice. Species that are well-known and well-liked among the specific target audience will have the greatest likelihood for success. Which species meet these criteria can depend on the context and personal experiences that members of the target audience have had with the species.

(2) Anthropomorphic design. Variation in the anthropomorphism design will be perceived differently by the target audience. For example, the degree of anthropomorphism can impact attitudes about the animal, perceptions of similarity and a person’s response to it. Furthermore, the same design could be perceived differently between different types of visitors (e.g. children versus adults).

Behaviour selection. Preliminary findings about the use of anthropomorphism in promoting conservation behaviours suggest that it can be effective in promoting behaviours that ask people to take actions to help take care of a species. Because not all caring actions have conservation outcomes, anthropomorphism’s efficacy may be limited to wildlife conservation actions that involve caring for the animal. This means that the behaviours to be promoted must be carefully considered.

Pilot testing. Given the diversity of possibilities for anthropomorphising any animal and the range of possible ways in which the message could be perceived, pilot testing the communication design with a subsection of the target audience can help maximise the effectiveness of the intervention before launching the campaign. When planning for the campaign launch, it is recommended that the timeline includes a pilot test and time to alter the communication design in response to lessons learned from the pilot study.

The argument for the use of anthropomorphism to motivate conservation actions is relatively new. Research is currently underway to tease out more specific recommendations to maximise the motivational potential of an anthropomorphised species in promoting conservation actions both in a zoo setting and in a broader conservation context.

Conclusion

With large collections of charismatic fauna, zoos are uniquely suited to employ anthropomorphism as a tool to heighten concern and action for wildlife conservation issues. The challenge will be to design anthropomorphised communication materials that maximise perceptions of similarity, relatability and concern for the species specific to the intended audience. We hope that the overview and recommendations presented here will provide a useful framework for zoos to develop and test anthropomorphised communication interventions as a means to promote conservation actions among their visitors.

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References
