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A study evaluating what best inspires visitor behaviour and attitude changes in zoos, with a small botanical garden comparison: addressing zoos' educational and subsequent conservation values

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A study evaluating what best inspires visitor behaviour and attitude changes in zoos, with a small botanical garden comparison: addressing zoos educational and subsequent conservation values

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Abstract

The planet is currently under intense stress, though unsustainable consumption carries on rising at an exponential rate. One explanation for this is ignorance, especially within developed nations. Governments and industry are under extensive pressure to increase awareness, if we are to achieve a sustainable future and prevent the loss of the natural world. Zoos with their high visitation numbers have a significant role to play in educating the public, which they declare as a main goal. This study focuses on how zoos can better achieve this educational and subsequent conservation goal by looking into what learning techniques at Dartmoor Zoo and Paignton Zoo best inspire behaviour and attitude change amongst visitors. Data collection consists of; observation sheets to help clarify the results for 100 exiting questionnaires at each zoo; as well as 110 exiting questionnaires at Eden to gain further understanding of the value of animal attractions. The outcomes from this research are an overall greater understanding of the factors that influence inspiration for conservation; adding to current literature on the importance of the sense of helplessness; feeling of being powerless or incompetent, and the emotional value achievable at zoos created by their animal collections. Furthermore, this study highlights the importance of familiarity (e.g. impact of the repetition of a symbol in improving education) more so than past literature, which has also overlooked the value of non-commercialised environments. The best learning techniques that came out from this study are: talks, close encounters, species type/enclosures and information boards/signs. Emphasising the importance of social interaction and contradicting past data which depreciates the value of information boards.

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1. Introduction

Zoos are ex-situ conservation attractions; free-choice learning site for the general public, by which a range of fauna species are conserved outside their natural environment in an enclosed area. 'Free-choice learning' is defined as an informal learning experience, where learning is under the choice and control of the learner (Falk, et al., 2009), promoting the importance of flora and fauna, habitats and conservation, but also influencing their visitors attitudes, values and actions (Willison, 1997). Botanical gardens, aquariums and nature reserves are also ex-situ conservation attractions, and are of high importance in the fight for the conservation of our natural ecosystems and species. It must also be noted that these institutions are also places of formal education; collaborating with schools, colleges, universities and teacher training institutes (WAZA, 2005). The degree of such attractions impact is substantially determined by the awareness promoting methods used and how these methods are carried out, which tends to differ from attraction to attraction. It is necessary for well-designed cognitive approaches, effectively communicating the importance of preservation (Dodd and Jones, 2010); perfected by social research into such attractions, if not they may be purely perceived as areas of recreation and aesthetic value.

1.1 Importance of Awareness

The world is amidst a serious crisis, with cited extinction rates 100-1000 times the historical background rates (WAZA, 2011). The environmental problems we are facing at present include: global warming, acid rain, air pollution, ozone depletion, water contamination and depletion, waste and deforestation (Nickerson, 2003). It is also widely accepted that the worldwide economic trends are unsustainable, and the recent Stern report has concluded that 'climate change could cause global economic devastation greater than either of the last century's two world wars or the Great Depression' (Wilson, 2006). These problems stem from the behaviours of individuals and societies (Nickerson, 2003), therefore societies need to develop and adopt more sustainable practices that do not threaten our resources and consequently the quality of human existence (Ballantyne and Packer, 2011). Education has been acknowledged by the United Nations and its agencies, national governments and the European Union as a key element in addressing sustainable development in any program (Scott and Gough, 2004). What appears to be one of the most important and difficult tasks facing governments and conservation organisations, industry and business according to Scott and Gough (2004) is persuading individuals to rapidly adopt environmentally responsible practices in their home and work lives. Progress depends on the development of the public's understanding of the importance of relationships between species, the environment and individuals' attitudes and actions (WAZA, 2005). Though people are becoming increasingly separate from nature, with at least half of the world's population living in cities, which is fortunately where a majority of zoos are situated. Too many believe that biodiversity can be achieved by a few protected areas for our own enjoyment, with a lack of understanding of interconnectedness of everything, which is critical to our survival (WAZA, 2011). Biodiversity is important environmentally, socially and economically. Falk et al., (2007) concluded from their study that knowledge, affect and behaviour are inextricably linked and that spending time in nature is critical for the development of environmental ethic and in promoting healthy children. Ballantyne, et al., (2007) reiterate these findings by saying 'that increasing visitors' awareness will lead to compliance with pro-conservation practices and thus help to combat the possible

negative impacts of humans on the animals and their habitats'. Proof of the progress of improving awareness is the fact that internationally the demand for eco-tourism and sustainable products and services is increasing (Butler, 1999; Hassan, 2000; Liu, 2003; Marshall, 1996; Tarrant and Cordell, 2002).

1.2 Importance of Zoos and Botanical Gardens

Botanical gardens and zoos have large visiting numbers and distribution; there are approximately 2,500 botanical gardens in 148 countries worldwide (BGCI, 2010), and are more often than not located in urban areas (Sauders, 2007). It has also been estimated that there are over 250 million visitors annually to public gardens globally (Ballantyne, et al., 2008). For zoos, WAZA, (2011) state that they know that their collective institutions host around 700 million visitors each year, that's 10% of the global population. Furthermore, WAZA only have the statistics for a minority of zoos, by the early 1990s there were more than 10,000 zoos worldwide (Mason, 2000), so global visitation numbers can be expected to be much more. Ebersole (2001) claimed that half the US population visit zoos and aquariums each year, and around 36% do in Australia (Australian Bureau of Statistics 2007); developed nations with unsustainable consumption rates.

Visitation numbers is important with an increasingly urbanized population, ex-situ conservation attractions are in a unique position and as WAZA (2005) states that for the young people of the world's cities they are the incubators for the conservationists of tomorrow. The necessity of such places is amplified as species and ecosystems importance is poorly reflected in the media; with main focuses including conflict, drought, famine and migration rather than the root causes such as consumption habits. Furthermore, human development and demands on sustainability, economics, security and concerns about globalisation and corporatism, dominate international political agendas (WAZA, 2005). Augmenting the necessity of zoos and botanical gardens; the ability to feel, smell, hear, and appreciate the value of nature through personal experience is of vital importance in supporting conservation (WAZA, 2005). Without any emotional access, it would be far more difficult to create interest and motivation (WAZA, 2011) for securing a future for nature. Free-choice learning experiences are of great importance when considering that on average formal education only makes up 3% of an average citizens life span (Falk and Dierking, 2002) access to informal learning experiences is required to continually refine and update their knowledge and understanding of present environmental challenges (Falk, et al., 2009).

Their existence is also important considering demand for eco-tourism and wildlife experiences is increasing and therefore such establishments can help encourage and influence such societal changes (Singleton, 2001; Connell, 2004 and 2005). Zoos and botanical gardens exceed their ranges in comparison to NGOs, as they can cover all aspects of conservation: ex-situ breeding, research, public education, training, influencing, and supporting in-situ conservation efforts (WAZA, 2005). They can provide a public face for conservation activities and act as a base for NGOs, for the public to visit, promoting projects, including that for less charismatic or 'impressive' species that are deemed as not newsworthy (Zimmermann, et al., 2007; WAZA, 2005). WAZA (2011) stated that the collective spend on their zoos alone for field conservation was estimated at US\$350 million annually, placing this zoo and aquarium community right up with the major NGO's.

Furthermore, people that become compassionate and informed about conservation are more likely to make lifestyle changes and change voting habits (WAZA, 2005). Effective programs can influence what people watch on TV, what they read, consumer choices, and encourage visitation to like institutions (Dierking et al., 2002), as they make visitors appreciate what is going to be lost if no action is taken, driving home the conservation message based on science and common sense (Zimmermann, et al., 2007). An example of such institutions contribution to conservation through the promotion of awareness and public support through petitions is the EAZA Bush-meat campaign, which consisted of a number of zoos working together for a certain conservation issue. They collected over 1.9 million signatures, the largest petition ever received by the European Parliament (Zimmermann, et al., 2007). Such institutions educational activities will help make reality of the goals for Agenda 21 (an initiative of the 1992 United Nations Conference on Environment and Development in Rio Janeiro); Chapter 36 of Agenda 21 entitled 'Promoting Education, Public Awareness and Training' provides an umbrella for all action related to education for sustainable development, including those foreseen by other UN conferences (WAZA, 2005).

Despite such institutions contribution to conservation, zoos and aquariums in particular are opposed by a growing animal rights and animal welfare lobby, as well as a number of conservationists who doubt the justification for removing animals from the wild. Therefore, it is important that zoos and aquariums in particular make clear that their mission is of conservation, in tandem with the highest welfare standards, highlighting their current efforts (WAZA, 2005; Malamud, 1998).

1.3 Gaps in Past Research

If ex-situ conservation attractions such as botanical gardens and zoos are to create an environmental ethos in visitors, research is needed to inform the design and delivery of such approaches that captivate their audience (Ballantyne, et al., 2008). Despite the emphasis such places put on their education and impact on visitors there is little research in visitors receptiveness to such messages; Marino et al., (2010); Zimmermann, et al., (2007); Swanagan, (2000); Dierking et al. (2002) state that there is an incomplete understanding, and an absence of research of zoos and botanical gardens educational, behaviour and attitude impacts on visitors. In the past three decades research has been focusing on how people relate to the natural world with little entusiasm on zoos and botanical gardens impact on conservation related knowledge, attitudes and behaviour (Dierking et al., 2002). In fact 'conservation education programs in general' are in their infancy (Jacobson, 1999), and few conservation education programs in zoos receive formal evaluations (Dierking et al., 2002), with only 50% of AZA institutions conducting evaluations, and even fewer being published in peer-reviewed journals (Stoinski et al., 1998). Furthermore, only recently has come to light, the importance of understanding visitors motivations for visiting conservation attractions, though it is generally accepted that the majority of botanical garden visitors do not come to learn per se (Darwin-Edwards, 2000). There is also little research in positive attitude changes in visitors, which is now believed to play an important role in improving attitudes and behaviour in favour of conservation (Rhoads and Goldsworthy, 1979).

1.4 The Project

This study has been carried out by means of questionnaires and observations (found in appendix A, B and C), to identify whether the criteria mentioned in past research is

pro-actively communicated within the three chosen attractions, as well as identifying the relevance of such criteria, and to see clearly which methods if any carried out by the attractions are in vain. The observations and questionnaires are created taking into consideration the aspects which tend to contribute most to conservation learning and attitudes; these include: observing animals in their 'natural' environment; opportunities for close encounters with wildlife; opportunities to observe animal behaviour; engaging visitors emotionally; connecting with visitors' prior knowledge and experiences; using persuasive communication; being appropriate role models; long-term initiatives; linking conservation goals and everyday actions; and providing incentives and activities to support visitors' behaviour change (Ballantyne, et al., 2007). It is also important that each attraction caters for a varied audience, as WAZA (2011) says 'every generation expects something different'. Though the questionnaire applies only to adults, for they are in the position to make life style changes and to take effective action as well as to influence the younger generations.

1.5 Aims and objectives

1.5.1 Aims

- To identify which awareness methods used in Dartmoor zoo, Paignton zoo and Eden Project are the most influential and educational.
- Identify the factors which influence the effectiveness of the attractions awareness promoting methods. Providing evidence of how first hand encounters with nature affects peoples conservation beliefs and the necessity for them to do their part to protect the environment.
- To improve understanding on such attractions effect on the general public, in general.
- Documenting the environmental awareness, interests and motives of these attractions visitors
- Compare the interests and motives of botanical gardens and zoo visitors; identifying the different impacts these two types of conservation attractions have on visitors' attitudes and behaviour.

The additional outcomes from this study are: act as a guide for future improvements for zoos, as well as for related attractions; strengthening their ability to provide meaningful and effective conservation education programs, whilst improving justification for zoos existence.

1.5.2 Objectives

The aims are to be achieved by the completion of a hundred questionnaires from each attraction, handed to visitors 18 years plus, who are exiting. Once all the data is collected the results will be graphed up and/or put in tables and similarities will be analysed on SPSS statistical software to identify any correlations between certain factors that influence behaviour and attitude changes that the questions in the questionnaire represent (tables and graphs of findings available in appendix D).

Literature research and observations are carried out by myself, to further identify the possible improvements such attractions can acquire, as well as justify why some methods have more of an impact than others and why the attractions responses differ, rationalising and adding to the data results.

1.5.3 Null Hypothesis

There is no correlation between the awareness methods used; the factors of influence; the attraction and visitor classification, in relation to the level of visitor awareness and changed behaviour and attitudes on nature and conservation after their visit.

1.5.4 Alternative Hypothesis

There is a correlation between the awareness methods used; the factors of influence; the attraction and visitor classification, in relation to the level of visitor awareness and changed behaviour and attitudes on nature and conservation after their visit.

2. Background

2.1 History of Zoos

Exotic animal collections date back to the Mesopotamian kings and Egyptian pharaohs, these collections are known as ancient menageries (Seidensticker and Lumpkin, 1991). Their purpose was to impress and entertain others; personal enemies, neighbours, people of high social standing, and to whom they ruled (Baratay and Hardouin-Fugier, 2002), they symbolised prestige, power and entertainment (Zimmermann, et al., 2007). In the 18th and 19th centuries, venues opened to the public and zoos increasingly took on the purpose of improving scientific knowledge and education (Zimmermann, et al., 2007). Vienna Zoo is one of the earliest examples of this, as since 1752 they have been partaking in animal husbandry, care and exhibition (WAZA, 2011). In the 19th century European zoos opened their gates to the general public, still with the tenacity to impress neighbours and rivals (Baratay and Hardouin-Fugier, 2002). Institutions such as the Zoological Society of London, also consisted of a library and important publications, and public lectures starting in 1870, courses of instruction for school teachers in 1910, and group admittance to university students in the 1930s (Bullough and Hamilton, 1976) advancing the purpose of zoos to one of education. Though there was no conservation message being emanated up to the early 20th century, failing to consider the animals' behavioural and psychological needs, animals tended to be placed one species per cage, in a taxonomical arrangement, sending strong subliminal messages about the dominance of humans over nature (Hancocks, 2001). This was until Carl Hagenbeck, a famous animal dealer in the early 1900s, created bar-less exhibits showing casing stage illusions of wild habitats containing mixed species, consequently helping collection managers consider individual animals and their interactions with their environment (Hancocks, 2001). Zoos have now been working towards the conservation of threatened animal species for at least 75 years (WAZA, 2005). The change of focus for zoos, to one of conservation began in the 1960s and 1970s, due to the realisation of species survival and the one-world theory (Ebersole, 2001; Zimmermann, et al., 2007). This reflected the public's growing awareness and consideration for the environment and animals, resulting in such institutions rebranding themselves as agents for species preservation and public education (Marino, et al., 2010). In 1980, the Association of Zoos and Aquariums (AZA) declared that conservation was a top priority (Zimmermann, et al., 2007). Zoos educational objectives were not of priority until mid to late 20th century. As proven by Hensels (1978) survey findings; that only 4% of US based zoos and aquariums responding had educational departments prior to 1950, while 77% did in 1977. Another change is that in the 1970s zoos main educational focus was on school

children (Hensel, 1978), until the 1980s when they realised the importance of reaching a wider audience, including adults and well educated individuals (Tompson, 1989).

2.2 History of Botanical Gardens

Between 1543 and 1901, botanical gardens became prominent imperial possessions (McCracken, 1997). The current global spread of Botanical Gardens is very different as displayed left; with over 500 botanical gardens found in Western Europe – 130 of them found in Great Britain, 350 in North America, and around 200 botanical gardens in East and Southeast Asia, most of which are found in China and most southern Asian botanical gardens found in India (BGCI, 2010), this spread vaguely indicates the influence of colonial Britain.

By the early 19th century Europe were receiving a flood of flora from overseas, which were scientifically classified, grouped in beds according to their families, and beds were sometimes even arranged taking into consideration the lines of evolution from one family to another. Furthermore, curvilinear conservatories were designed in order to effectively house tropical species and some species were dried and preserved and kept in a building called a herbarium. In the late 18th century Sir Joseph Banks initiated the creation of colonial gardens, after the realisation of the economic value of foreign flora, these colonial gardens acted as bases for plant hunting and acted as experimental gardens to find any species which could lead to colonial economic development. By the turn of the 20th century there were four botanical gardens integral to the British Empire: Calcutta, Pamplemousses on Mauritius, Peradeniya on Ceylon and Trinidad. They were part of a botanical network centred round the Royal Botanical Gardens, Kew, across Europe, and other large centres across the globe such as Rio de Janeiro, exchanging scientific botany. Kew was the central herbarium for the British Empire, where the majority of flora was named and classified. Behind the public aesthetic value of Botanical Gardens serious scientific and horticultural work was and is carried out; taxonomy and classification. This work has been vital for the conservation and survival of many flora species and has created a solid foundation for the environmental conservation movement of the late twentieth century (McCracken, 1997). Now botanical gardens take great responsibility in educating the public on the inter-relations of the world's systems, its fragility and on conservation issues (Mintz & Rode, 1999; Willison, 1997). Botanic Gardens Conservation International (BGCI, 2010) definition for Botanical gardens from the International Agenda for Botanical Gardens in Conservation is:

“Botanic Gardens are institutions holding documented collections of living plants for the purposes of scientific research, conservation, display and education”.

2.3 Zoos and Botanical Gardens Obligations to Conservation and Education

Botanical gardens have shared global strategies for plant conservation, through BGCI. The first of these strategies was the Botanic Gardens Conservation Strategy published in 1989 (IUCN BGCS and WWF, 1989) which linked to the World Conservation Strategy published by IUCN in 1980. Botanical gardens conservation plans are linked with the Global Strategy for Plant Conservation (WAZA, 2011), in relation to target 8 and 14 of the GSPC agenda; for target 8 calls for 60% of threatened plant species to be in ex-situ collections and 10% of them in recovery and restoration programmes (WAZA, 2011). Target 14 requires for the importance of

plant diversity and the need for its conservation incorporated into communication, educational and public awareness programmes (WAZA, 2011).

All responsible zoos were obliged to play a role in achieving the goals of the World Zoo Conservation Strategy (IUDZG/CBSG 1993), which are: actively supporting conservation of endangered species through coordinated programs; Offering support and facilities to increase scientific knowledge that benefits conservation; and Promoting an increase of public and political awareness of the need for conservation, and to use this to help generate their mission statements. Also, the European Community Zoos Directive of 1999 requires all licensed collections to make some contributions to conservation, education and research (EC, 1999). The education standards stated in Figure 1 were formed by the European Association of Zoos Aquaria (EAZA) in September 2001, where by member institutions are obliged to keep to these education standards (WAZA, 2005).

Summary of the EAZA Education Standards (2001)

1. The education role of the zoo is to be clearly stated in its written mission statement.
2. The zoo must have a written education policy identifying components and setting out the methods by which these components are directed towards the different sections of the zoo's visitor audience. Zoo education should target all visitors, not just schools.
3. The zoo must demonstrate that it is carrying out its education policy, by reference to specific projects, attendance figures, evaluation procedures and research.
4. At least one member of staff within the institution should be responsible for professional implementation of the education policy.
5. Enclosures must clearly and correctly identify the animals in them. Signs should highlight threatened species and species in regional, national and international coordinated breeding programmes.
6. When animal demonstrations form part of the programme, they must contain an education or conservation message.
7. For education programmes to be successful, zoos must exhibit animals in the best conditions possible, in enclosures that enable them to live as naturally as possible and to exhibit natural behaviour as far as possible.
8. Interpretation and education should be an integral part of zoo exhibits; the educator should be involved in the exhibit planning and collection planning process.
9. A reference library appropriate to the size and complexity of the zoo should be maintained and made available to all staff members, and possibly to the public where practicable.
10. Resource material and education information should be made available to the general public and zoo audience. This might include leaflets, guidebooks, teachers' notes, resource packs and worksheets, which should be displayed and available.

Figure 1. Education Standards that EAZA member institutes need to abide by (WAZA, 2005).

2.4. Data collection sites

2.4.1. Reasons for choice in attractions

The reason for choosing to compare Dartmoor Zoo and Paignton Zoo is that they vary in size and income, ensuring a representative sample of zoos in general. This will help to identify if it is necessary to invest in more financially demanding activities/programs that Paignton Zoo is more obliged to do. Furthermore, there are two zoos and only one botanical garden as Marino et al., (2010) assert that studies so far yield an incomplete understanding of the impact of zoos educational and conservation oriented objectives, and their influence on visitors behaviour (Anderson et al., 2003), and with the prejudice still surrounding zoos it is important that this topic is more concluded.

The reason for including the Eden Project is that it is an internationally renowned botanical garden, and prides itself on its' educational potential, providing a range of immersive learning techniques. Furthermore, to date, there have been few systematic studies examining botanical gardens impact on visitors' environmental awareness, interests and motives (Ballantyne, et al., 2008). With the general belief accepted being that most visitors do not come to learn (Darwin-Edwards, 2000). With only one study apparent; Ballantyne, et al., (2008), which consisted of a range of free-choice learning settings resulted in the penalisation of botanical gardens efforts. With the results stating that garden visitors were less interested and committed to conservation issues, and less motivated to learn than visitors to either: museums, zoos, aquariums, heritage sites, natural areas and wildlife tourism activities.

2.4.2 Paignton zoo

Paignton zoo opened to the public in 1923, with a respectable history, well established in Paignton (Devon, England), located one mile from the city centre located along a main road and it is a very popular attraction. The zoo has been commended with a variety of awards covering: research, as a green/sustainable tourism attraction, the quality of the experiences the zoo offers and animal welfare (Paignton Zoo, 2011). This diverse zoo includes: a walk through aviary and breeding centre, ape centre, reptile nursery, reptile tropical house, desert house, crocodile swamp, veterinary centre, education centre and verticrop, amphibian ark, a nature trail plus more. Along with these experiences the zoo consists of a large variety of charismatic and "influential" animals including: Asiatic lions, Sumatran tigers, an elephant, giraffes (including calf's), baboons (including babies), cheetah, crocodiles, a variety of gibbons, gorilla, lemurs, macaques, mandrills, meerkats, a large variety of monkeys, Orang-utan, Black Rhinoceros, tamarins, and wolves amongst others. Although, Paignton zoo is an animal park there is also an emphasis on botany present, and considering the 'one-world approach' this is necessary for the appropriate teaching of visitors.

2.4.3 Dartmoor zoo

Dartmoor zoo is a 33 acre family owned woodland zoo in the countryside, just outside Dartmoor, 20-30 minute drive from Plymouth City Centre in Devon. It is a young zoo opening in 2007 with little financial backing and a small annual visiting number in relation to Paignton Zoo. The beginnings of the zoo was documented by the BBC as a documentary and there is also a book written by the owner called *We Brought A Zoo*, which has been published in over 20 countries and influenced the adaptation of a Hollywood film starring Matt Damon and Scarlett Johansson.

Dartmoor Zoo won the Eden Channels Top Wildlife Attraction of the Year 2011 competition and consists of an education centre where by the close encounters and reptile room is set. There is also a small petting farm, African Lions, Siberian Tigers, Wolves, Lynx, Jaguar, Cheetah, Brown Bears, Meerkats, Vervet Monkeys and Otters, amongst others.

2.4.4 Eden Project

The Eden Project is built in a 160 year old China Clay quarry, near St Austell in Cornwall, finished in 2000. It consists of an impressive rainforest biome which is in the Guinness Book of Records as the biggest conservatory; there is also an impressive Mediterranean biome with an extensive range of educational outdoor gardens. Furthermore, there is a dome dedicated to educating visitors on contemporary environmental issues. This botanical garden has clear environmental ethos, it classes itself as a charity, contributing to many conservation projects and its sustainable initiatives contribute to the functioning of the attraction (Eden Project, 2011).

3. Methodology

The design of the questionnaire and observation sheets kept to the BIAZA and University of Plymouth guidelines (Appendix E) and was influenced by an array of past research. The past research was also beneficial in deciding what way the data was to be collected; conducting the hand out of only exit questionnaires to the attractions' visitors.

3.1 Data Collection

At each attraction between the times of 2.30 – 5pm questionnaires were handed out to departing visitors at the exits, who were asked to complete the questionnaire there and then. The justification for the post-only, retrospective-pre measure, as defined by Marino, et al (2010) is that it eliminates response-shift bias (the change in a participant's context of answering questions). Furthermore, this form of data collecting was utilised in Falk, et al (2007) and Professor John Falk is highly regarded in this field of study.

More days were spent at Dartmoor Zoo as its visitor numbers are far less than the Eden Project and Paignton Zoo. All participants were also only allowed to complete the questionnaire once and had to be of 18 years of age, as this was the age guidelines approved by the University of Plymouth (Appendix E: 8.5.1).

Observations were carried out before 2.30pm each time Paignton and Dartmoor Zoo were visited by myself, the observations conducted were not visitor observations but observations of the awareness promotion techniques carried out by the attraction, in order to see if the existence of certain methods had an impact on the visitors participating in the questionnaires, and if so to what extent.

3.2 Survey Design

The questionnaire was kept succinct and consisted of both close-ended and open-ended questions, with a mixture of formats to keep the participants attentive and less likely to induce quick completion, and thus vague and absent-minded answering. The questionnaire and observation sheet questions were both heavily influenced by past research, particularly Zimmermann et al's (2007) five forces of influence, as well as:

motivation for visiting, classification, visitor perception of zoos, long-term initiatives, familiarity and positive communication for these were seen as influential factors in past data. For this study they are signified as the 11 factors that influence behaviour and attitude change.

The observation sheets were designed to link appropriately with the questionnaire to help clarify the results and to create a greater understanding of why certain awareness promoting methods and factors of influence are the most effective.

3.3 Motivations for Visit

The first question in the questionnaire is 'What is the main reason behind your visit?' this question is of high importance as according to Ballantyne, et al., (2008) there have been few studies in botanical gardens on visitors interests and motives. Also only recent research realises the importance of understanding the motivations for zoo visits (Falk, et al., 2007). For understanding visitors motivations helps to create appropriate educational services for the majority. As these differences influence how individuals use these institutions and what benefits they derive; strongly influencing long-term learning and sense of satisfaction with a visit (Falk, et al., 2009).

3.4 Classification

The questionnaire has five classification questions, as the demographics of an individual has a large impact on that persons pre-environmental knowledge, perceptions, beliefs, interpretation and outcome of such a visit, as well as prejudice in filling out questionnaire (this is especially relevant to question 12). The classification questions believed to be most relevant to the study are:

- Question 7 – 'Do you currently participate in any way to conservation?'
- Question 12 – 'How many times have you visited this attraction?'
- Question 13 – 'How old are you?'
- Question 14 – 'Education:'
- Question 15 – 'Please state your occupation below:'

The age range for participants is 18+ for more appropriate completion and also adults are capable of making life-style changes and are imperative in raising the next generation with an environmental ethos.

3.5 Education and Communication

The different methods of free-choice learning and the way in which they are worded and displayed, along with the overall attractions presentation are all interlinked in relation to their emotional and long-term affect in changing visitor behaviours and learning outcomes. This part of the questionnaire is extremely important in this study and thus, why the observation sheet was created to supplement the results.

3.5.1 Awareness Promoting Approaches

The questionnaire inquires on the most effective methods used in each attraction, for questions 9: 'which part/exhibition in the attraction has had the greatest impact on you? – *emotionally and educationally*' and question 10: 'Circle below a learning technique that you came across today, that you felt was the most effective in terms of conservation awareness?' and 10b: 'What learning technique did you enjoy the most?'. These questions were inter-related with the observations on the talks, signs, observing animals, observing exhibits and lists of different learning methods seen. To

improve justification for the future results and to help understand what improvements may possibly be needed at the two zoos. There are certain things which will be looked out for, thanks to past research highlighting their importance:

In relation to demonstrations, interactive programs and talks, a lot of attention was focused on them due past research proving that such practices were found to be entertaining with an effective delivery of a pro-conservation message (Swanagan 1993, 2000; Yerke and Burns, 1991). Swanagan (1993, 2000) found that after an elephant demonstration visitors were more likely to support elephant conservation methods, and more likely to correctly answer questions about the animals, when compared to visitors who just passively viewed the elephants. Also, such experiences resulted in visitors retaining large amounts of content material weeks after (Heinrich and Birney, 1992).

A lot of enthuses in the observations must be put on how the animals are perceived as individuals, as they have a large impact on the visitors emotions and thus their appreciation and knowledge in regards to the species, as Milson (1990) concluded when assessing the impact of a close-encounters session with snakes. Observations will also be focusing on the degree to which the animals will be introduced as individuals in talks and information boards, relating conservation issues directly to their non-captive counterparts; and providing information on what visitors can do to help preserve their natural habitat (Gates and Ellis, 1999).

3.5.2 Animal Observations

Observations will also focus on the animals themselves excluding demonstrations and talks etc. as Ballantyne, et al., (2007) discovered that observing 'natural' behaviour has the potential to increase visitor understanding of the animal and positive attitudes to their conservation, alone. The characteristics of the animal has huge influence to visitors, especially when the animal is active (Altman, 1998; Bitgood et al., 1988; Broad, 1996; Wolf and Tymitz, 1980), for visitors tend to stay at exhibits longer (Jackson, 1994; Johnson, 1998).

3.5.3 Exhibits

The exhibits themselves (excluding fauna) are observed, looking for realistic displays, showing the majesty of natural systems, provoking passion for the survival of natural systems. It is important that the use of bars, plastic balls and steel food trays (things unnatural) are interpreted (WAZA, 2011). As a 1989 study by Kellert and Dunlap found that zoos with an educational focus that displayed animals in authentic environments had a positive impact on visitors' attitudes toward wildlife, while more traditional zoos increased their fear of or indifference to wildlife. Past research also states that visitors find natural enclosures more attractive and will therefore spend more time observing and learning about animals presented in this manner (Shettel-Neuber, 1988; Johnston, 1998).

3.5.4 Long-term Learning Initiatives

Moreover, in the observations long-term initiatives will also be sighted, these could be: souvenirs with prominent conservation messages, environmentally friendly products, promotional activities, membership programmes, websites, books; extending the time and space for the messages (Adelman et al, 2000). Also, highlighting enthusiastically e.g. eco-labels can help remind people about desired behaviours when required (McKenzie-Mohr and Smith 1999), though according to

Hungerford and Volk (1990) after reviewing a series of longitudinal studies; without some sort of intervention treatment initial conservation actions declined over time. Also, being able to reflect experiences according to Ballantyne, et al., (2010) is important for post visit behaviour change. Kaplan and Kaplan (1983) stress this point further implying that it increases interest and remains salient in visitor minds. Reflection can be improved through physical and sociocultural contexts e.g. proximity or view of animals, and ability to discuss the experience with staff or companions (Ballantyne, et al., 2010). Therefore, presence of staff and flora and fauna will be observed.

3.5.5 Familiarity

Familiarity also helps promote behaviour change, according to Kaplan and Kaplan (1983) and environmental education and environmental psychology literature indicate that these features are needed to affect behaviour change in individuals, so repeat exposure to messages and consistency will be observed.

3.5.6 Positive Communication

The way in which messages are communicated is also of high importance which is why the questionnaire asks:

- Question 2 – ‘How has your perception of the natural world been altered after your visit today?’
- Question 3 – ‘Do you think the loss of natural environments will affect you?’
3B – ‘Before your visit today would your answer have been different?’
- Question 4 – ‘Are you optimistic or pessimistic about the natural world’s future after today?’
- Question 6 – ‘Do you feel you can make a difference? And why?’

These questions are supplemented by the observations on the talks, signs, highlighting the attractions efforts on promoting people to change behaviours, and optimistic communication efforts, especially.

The reason for why communication was given such high regard is the extent of past research; effective communication can instigate motivations such as commitment, altruism, and intrinsic satisfactions will promote behaviour change and willingness to learn (Falk et al., 1978), as well as highlighting the benefits of nature’s aesthetics value (WAZA, 2005) and our dependency on it. According to Ballantyne et al., (2001); Myers et al., (2004) educational literature suggests that emotions influence conservation learning. So any forms of wording and interactive communication methods which evoke emotion will be observed.

3.5.7 Helpful/Useful Communication

Emphasising further communication and education in the data collection are the conservation solution questions, which includes question 6 mentioned above and question 8: ‘After your visit to this attraction are you more likely to.... *Be a more cautious shopper?, Volunteer?, Donate?, Visit other attractions?, Recycle? and Other?.*’ Complemented by the observations on how each attraction informs visitors on sustainable living and presence of attractions sustainability initiatives.

This is a crucial part of the data, as past research proves that this is important for provoking behaviour change. The extent of which is determined by how these

initiatives are communicated; with Hayward, 1998 study at Monterey Bay Aquarium findings that exhibits which highlight conservation issues but fail to provide solutions or suggestions for individual actions can be counter-productive because they erode visitors' confidence in their ability to combat conservation problems (Yalowitz, 2004). Programmes must inform people on relevant skills or actions (Monroe and DeYoung, 1993), for reducing people's sense of helplessness can motivate visitors to adopt friendly behaviours (Manubay et al., 2002; Falk, et al., 1978). Thus, the visible actions that attractions inherit, which are plausible for their visitors will be observed e.g. nest boxes for birds and dormice, or roosting boxes for bats, re-using and recycling, and garden improvements such as leaving weeds and rotting wood for insects and making ponds (WAZA, 2005), along with any attention the attraction puts on local initiatives as Ballantyne and Packer (2005) state the necessity of this to inflict behavioural change.

Furthermore, the majority of visitors are aware of the issues but think it someone else's job e.g. government. Individuals are likely to feel insignificant, therefore, visitors must be convinced that adopting conservation behaviour will be beneficial to the environment (Orams, 1996) and for future generations (Yalowitz, 2004) they must also feel that their role is not optimal but critical to the success of an initiative (Kaplan, 1990; Folz, 1991).

Community-Based Social Marketing Theory (McKenzie-Mohr and Smith, 1999) suggest that messages should target perceived barriers that prevent people from adopting sustainable practices, such as lack of information and time. Messages should state personal benefits of adopting such changes e.g. cost saving. Overall, Interpretation needs to be persuasive, factual, positive and pro-active (WAZA, 2005; Manubay et al., 2002).

3.5.8. Visitors Perceptions on the Benefits of the Attractions

Lastly, visitors perceptions of such attractions, especially zoos, is important as negative impressions can erode such attractions potential for conservation and education, concluding in them being under-estimated, under-funded and under-developed in their goals (Zimmermann, et al., 2007). Which is the reasoning for question 11: 'Do you think attractions like these play an important role in conservation?' Furthermore, this question helps to understand the type of visitors which come to such attractions, and indicates if the attractions are doing enough to educate their visitors as well as being good role models. Falk et al., (2007) states that zoos need to emphasize conservation action, as their visitors generally do care about animals therefore, good and clearly explained animal welfare standards are needed, which is another reason for the observations on exhibits and animal behaviour.

3.6. Pilot Study

There were three draft questionnaires designed before the final questionnaire was agreed upon, after the advice from the Education officer in Dartmoor Zoo and the Universities Social Geography Professor Paul Simpson. The first pointers given for the draft questionnaire was that the way in which the questions were phrased needed improving; for example, Paul Simpson said 'question 2 explicitly starts from the assumption that the natural environment should be upsetting and therefore it is a case of measuring how upset they are'. And question 6 of the second draft questionnaire seemed judgemental; asking 'Whose job do you think it is?' such a question could leave participants feeling uncomfortable with such a stigma. Also, with

the questions consisting of a list of options to choose from, the choice of 'other' or 'other-please add' category was necessary.

Furthermore, the advisors had negative thoughts on the idea of a pre and post questionnaire, which the first three draft copies were. The reasons being was the need to ask for participants surname at the end of each questionnaire in order to identify individuals changes in knowledge and attitude had anonymity and data storing and analysis implications. Furthermore, people might have a stronger feeling straight after which is likely to wear-off, equally, for other participants it may take longer to sink in, impacting interpretation of the data and the reality of the results. The last piece of advice given for the final draft was to add more classification questionnaires.

Copies of the questionnaire were given to each attraction and agreed upon and five volunteers from Dartmoor Zoo were asked to complete a questionnaire each, whilst being timed to get an estimate of how long it takes for completion, which was around 5-10 minutes, very much dependant on the person.

3.7. Data Analysis

After completion of Dartmoor and Paignton Zoos questionnaires the close-ended questions were analysed through SPSS statistical software. This enables individual questions that represent a factor of influence (e.g. positive communication) to be matched with another relevant factor, for example: positive communications effect on provoking life-style changes per individual (Appendix D).

The responses to the open-ended questions were tallied in Microsoft Excel (Appendix D: 8.4.3), for these were created to help clarify the close-ended questions results. The pertinent results were graphed up in Microsoft Excel to tie in with the appearances of Eden questionnaire results (Appendix D: 8.4.4) that were sent through email through Microsoft Word as tallies. This layout will achieve more palatable comparisons.

4. Results

The outcome of the data collection is 100 completed questionnaires at both Paignton and Dartmoor Zoo and 110 at Eden Project, including relevant observations at Paignton and Dartmoor Zoo. The findings are as follows:

4.1 Classification

As presented in Appendix D, no participants disagreed with the justification for zoos, so this factor of influence does not need to be taken into consideration when deliberating the results. The results do show however that zoo visitors are generally well educated; and from Appendix D it is apparent that the zoo participants are of higher educational standard than Eden. Furthermore, with such a globalised world, this is a very important factor to bring to attention, as it highlights that such attractions need to take into consideration that the general public are already well informed about the world's major environmental issues.

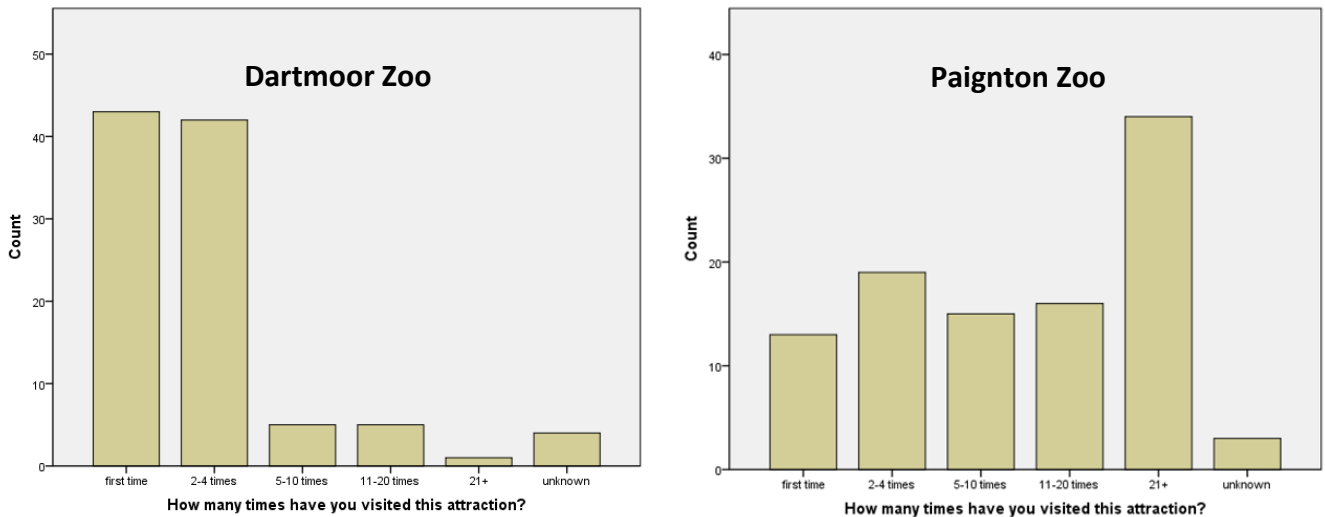


Figure 2 (left) and 3 (right). 100 responses at each zoo to the question: ‘How many times have you visited this attraction?’

As seen from Figure 2 and 3 above, when comparing the zoo’s results on regularity of the participants, the zoos were opposites; Paignton’s were frequent visitors, whereas over 80% of Dartmoor Zoo participants hadn’t visited more than four times, with around 43% stating it as their first visit. It is likely that the majority of Paignton participants are members or at least have partial loyalty towards the zoo, possibly creating biased in the answering of the questions in favour of Paignton.

4.2 Motivations for Visit

Dartmoor and Paignton Zoo questionnaire outcomes for the question: ‘What is the main reason behind your visit?’ (Table 1 and 2) imply that zoos need to concentrate catering to firstly families (in blue); consisting of approximately 70% of the zoo visitors for this study at both zoos and then visitors that come for fun and entertainment (in green).

Table 1 (top) and 2 (bottom). SPSS tables of the zoos responses to the questions: 'Which learning technique do you feel was the most effective in terms of conservation awareness?' and 'What is the main reason behind your visit?' represents any correlation

What is the main reason behind your visit? * Which learning technique do you feel was the most effective in terms of conservation awareness? Crosstabulation

Paignton Zoo			Which learning technique do you feel was the most effective in terms of conservation awareness?							Total	
			talks	audio information points	replicate/3D interactive models	motion clips	information boards/signs	photo/art	observing exhibits		unknown
What is the main reason behind your visit?	learn	Count	0	0	0	0	2	0	1	1	4
		% within What is the main reason behind your visit?	.0%	.0%	.0%	.0%	50.0%	.0%	25.0%	25.0%	100.0%
family day out	Count	3	7	3	2	26	4	22	3	70	
		% within What is the main reason behind your visit?	4.3%	10.0%	4.3%	2.9%	37.1%	5.7%	31.4%	4.3%	100.0%
escape from the city	Count	0	0	0	0	1	0	0	0	1	
		% within What is the main reason behind your visit?	.0%	.0%	.0%	.0%	100.0%	.0%	.0%	.0%	100.0%
curiosity	Count	0	0	0	0	1	0	2	0	3	
		% within What is the main reason behind your visit?	.0%	.0%	.0%	.0%	33.3%	.0%	66.7%	.0%	100.0%
fun/entertainment	Count	1	3	0	1	6	2	6	2	21	
		% within What is the main reason behind your visit?	4.8%	14.3%	.0%	4.8%	28.6%	9.5%	28.6%	9.5%	100.0%
unknown	Count	0	0	0	0	1	0	0	0	1	
		% within What is the main reason behind your visit?	.0%	.0%	.0%	.0%	100.0%	.0%	.0%	.0%	100.0%
Total	Count	4	10	3	3	37	6	31	6	100	
		% within What is the main reason behind your visit?	4.0%	10.0%	3.0%	3.0%	37.0%	6.0%	31.0%	6.0%	100.0%

What is the main reason behind your visit? * Which learning technique do you feel was the most effective in terms of conservation awareness? Crosstabulation

Dartmoor Zoo			Which learning technique do you feel was the most effective in terms of conservation awareness?					Total
			talks	close encounters	information boards/signs	observing exhibits	unknown	
What is the main reason behind your visit?	learn	Count	2	3	0	0	0	5
		% within What is the main reason behind your visit?	40.0%	60.0%	.0%	.0%	.0%	100.0%
family day out	Count	23	23	12	9	4	71	
		% within What is the main reason behind your visit?	32.4%	32.4%	16.9%	12.7%	5.6%	100.0%
curiosity	Count	2	1	0	0	0	3	
		% within What is the main reason behind your visit?	66.7%	33.3%	.0%	.0%	.0%	100.0%
fun/entertainment	Count	11	5	5	0	0	21	
		% within What is the main reason behind your visit?	52.4%	23.8%	23.8%	.0%	.0%	100.0%
Total	Count	38	32	17	9	4	100	
		% within What is the main reason behind your visit?	38.0%	32.0%	17.0%	9.0%	4.0%	100.0%

The above tables also show no noticeable correlation between motivations and preferred learning methods, though this is hard to certify as there is such little response to any other motivations for visiting.

4.3 Learning Techniques

Highlighted in yellow on tables 1 and 2 are each zoos highest nominated learning techniques by visitors for their conservation awareness value. These results are supported by the observations (Appendix B and C).

Dartmoor Zoo put a lot of enthusiasm into their talks and close encounters, which were regarded the highest by participants, and people will usually mention what they saw most of; linking to the most important factor of influence, familiarity. However, the observations did clarify that these two learning methods at Dartmoor Zoo were educational containing many of the factors of influence. Then again, people are likely to say what they saw last which was either a big cat talk or close encounters, and so doesn't truly clarify what learning technique is the most effective.

Paignton does utilise all the learning methods mentioned on the questionnaire, however they had a high response rate to just two of their methods, at a near identical percentage to Dartmoor Zoos response to their two main learning

techniques. Paignton's most educational practices were information boards and observing exhibits, the observations can help validate these findings and differences:



Figure 4 (left) and 5 (right). Photographs of both zoos information boards at species enclosures.

The above figures 4 and 5 are examples signifying the differences between the zoos species information signs present at each enclosure. Paignton Zoos signs are generally (as they do differ as shown in Appendix C: 8.3.1) a lot bigger and eye catching than those of Dartmoor Zoo. With the information more sub-headed, making it more palatable, especially for people who are not keen readers. Paignton's signs cite the specific animals conservation status in red (or a less vibrant colour depending on conservation status), making it more apparent. The species threats are also clearly stated as symbols (circled in red) on Paignton's sign (figure 5), these were highlighted as they are an effective learning approach; the popularity of Paignton's information signs and species numbers, and threats correlates with Paignton's results from question 5: 'After today to what extent has your awareness been improved about the following conservation issues?' with the highest ranked being over hunting, habitat loss and mammal numbers. Which corresponds with the observations that species conservation status are clearly stated and the symbols for habit destruction and over hunting were on the majority of the enclosure species information boards, once again highlighting the importance of familiarity.

Furthermore, Paignton had many more signs around the park on conservation issues and different ecosystems, whereas Dartmoor only had such extra information for their brown bears (Appendix C: 8.3.2), which was mentioned in the open-ended question 9, proving the effectiveness of such information boards. Aiding the high response rate further for Paignton's information boards is that many are placed under shelter (Appendix C: 8.3.1), and the data collection was carried out within winter months. Paignton scored significantly better for observing exhibits, from observations this is likely to be due to their impressive animal collection, especially the primates that

were mentioned a significant amount in the open-ended question 9 (found in Appendix D: 8.4.3) asking for peoples most educational and emotional experiences of the day. What was also mentioned frequently in question 9 was the elephant in a negative manner due to it being alone and old etc. indicating the importance of animal happiness, welfare and natural behaviour (as it is probable that participants were considering the fact that elephants are social animals).

However, negative impacts of having such an overall large animal collection as well as primate collection is apparent from the open-ended questions results, for Dartmoor Zoo and Paignton Zoo have the same amount and similar collection of big cats but Dartmoor appeared to have a greater impact emotionally and educationally. Implying that Paignton's primate collection is drawing attention away from other threatened species within the zoo. Conversely, from the observations this could be due to Dartmoor Zoo's visitors views into the enclosures being unobstructed by wire or glass (apart from the lions) and more enthuses is put into them in the scheduled talk and by volunteers present. Also, people are likely to spend more time around the big cat enclosures considering there are fewer animals at the zoo to observe.

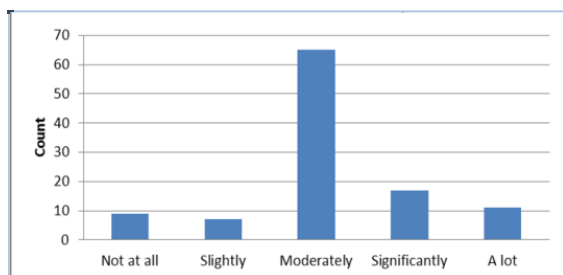
4.4 Zoos Educational Value this can override zoos educational value

When comparing the two zoos with Eden Project for question 5: 'After today to what extent has your awareness been improved about the following conservation issues?' it is very prominent that the zoo visits were more educational, with Eden's responses on the individual conservation issues averaging at >90% learnt nothing. While Dartmoor's average on scoring 1(learnt nothing) was 41.8% and for Paignton 28.5%. However, as mentioned in the classification section 4.1 the questionnaire partakers were generally well educated and the general public today are made well aware through media etc. about significant environmental issues. This is likely to affect the results for question 5, as participants way of marking is going to differ; some participants will mark lower because they had greater pre-visit knowledge about the attractions conservation messages expressed, not because the messages were not cognitive enough or due to any other factors of influence, implicating the zoos educational response. Alternately participants may answer the question inattentively and mark down what they feel they collectively know on each individual issue, instead of marking to represent what they had learnt from their visit. This scenario may help explain Eden's poor educational response, as their participants were of lower educational standing.

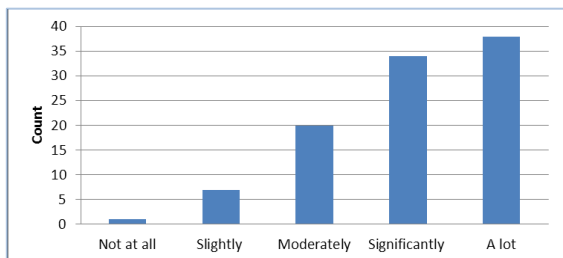
4.5 Relevance and Creation of Emotion

The questionnaire results show that visitors do leave the two zoos and the botanical garden with a healthy outlook on nature; classing it as mainly beautiful, Interesting or important at all three attractions (these results available in Appendix D). However, the response to the question on relevance of nature at a personal level does show differentiation between the zoos and Eden, as shown in figures 6 (left), 7 (middle) and 8 (right) below.

Eden Project



Dartmoor Zoo



Paignton Zoo

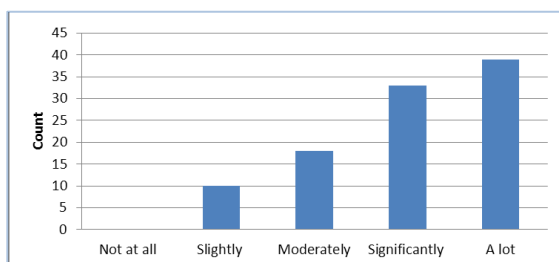


Figure 6, 7 and 8. Each figure represents the responses at each attraction to the question: 'Do you think the loss of the natural environment will affect you?'

Figures 6, 7 and 8 collectively show that the zoo participants are leaving with a far higher regard for nature than Eden with the majority in Eden feeling that they will be moderately affected and the bulk of zoo visitors feeling that they will be affected either significantly or a lot. The two zoos response to question 3 (questionnaire example in Appendix A) were nearly identical, which was unexpected due to the differing educational material and methods used at the attractions, and with Paignton and even Eden having far more than Dartmoor. So it can be deduced that it is likely to be caused by the emotional value created with the presence of animals, with a far greater emotional response rate to the

open-ended question 9a at the zoos in relation to Eden.

There is however reasons to believe that participants were being negligent when answering question 3. As there is inconsistency, with all three attractions results for question 3B 'Before your visit today would have your answer have been different?' being near identical, with the majority answering 'no'. Implying that Eden's participants are generally not as environmentally aware or considerate, this could overall create a negative outlook on Eden in this study.

4.6 Behaviour Change and Role Models

No relationship is apparent between zoos sustainability approaches and visitors behaviour changes. For the observations (figure 9) are a few examples of Paignton's initiatives as a role model and promoting lifestyle changes, whereas none are visible in Dartmoor. Though as shown by figure 10 both zoos results for visitors intentions for life-style changes are nearly identical. Also, the open ended question 6; asking people how they think they can make a difference, a high percentage for both zoos responded with an array of valid answers, leading to the assumption that the general public are well aware of what they can do but are not influenced enough into taking initiative, proven by the poorer replies to question 7 asking: 'Do you currently participate in any way to conservation?'. Figure 10 supports this by implying that people are more likely to change if it doesn't require effort on their behalf, with recycling being the most promising behaviour change from participants visit, though

in the UK everyone is provided with a recycling bin by their local council and therefore participants are likely to be stating what they already do.

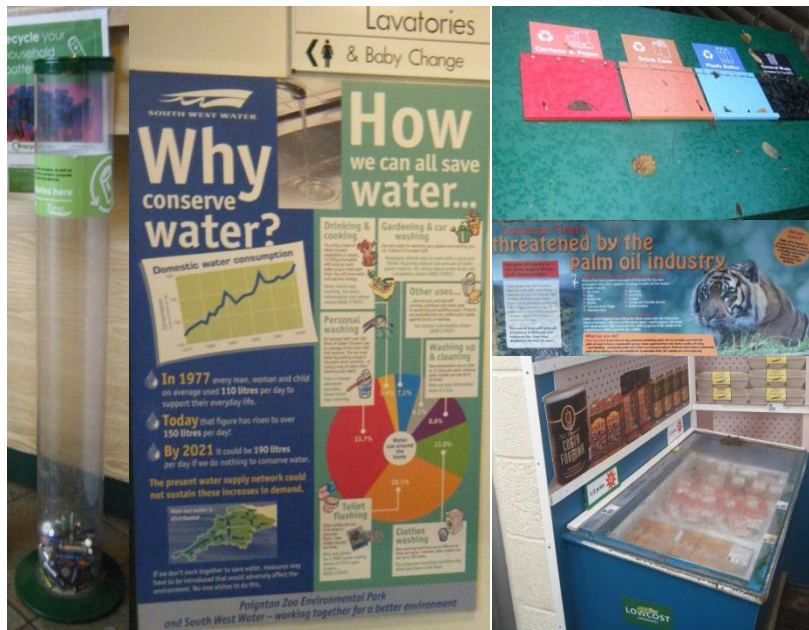


Figure 9. Photographs at Paignton zoo as proof of their efforts in provoking behaviour change and as being a role model for sustainability

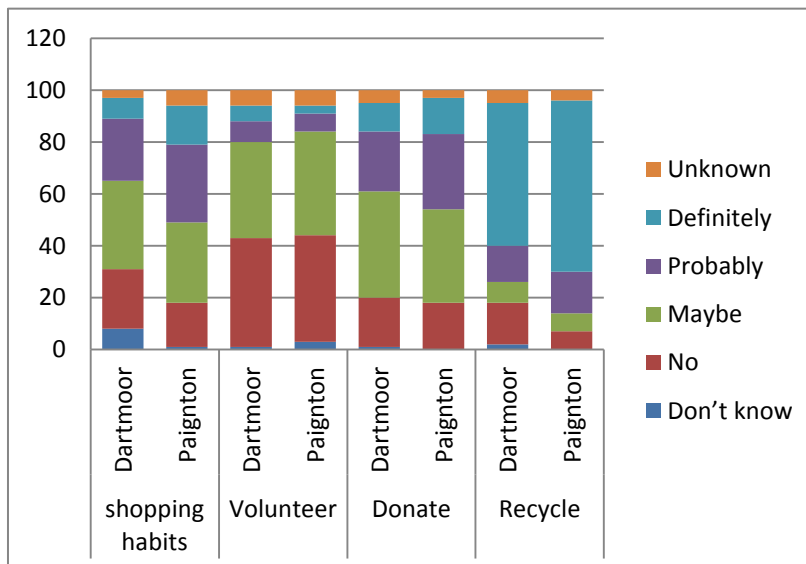


Figure 10. Graph of the likelihood of questionnaire participants of Dartmoor and Paignton Zoo, are going to change shopping habits, volunteer, donate and recycle, after their visit today.

4.7 Behaviour Change and Sense of Helplessness

It is apparent from the results that the influence of personal significance towards lifestyle changes is determined by the individual visitors, as Dartmoor Zoos visitors likelihood of being more sustainable seem to be influenced more so by the sense of helplessness than Paigntons (figure 11). Overall it seems that the feeling of helplessness does have an influence in provoking life-style changes, when comparing question 6 to the life style changes response rate for the two most crucial behaviour changes mentioned

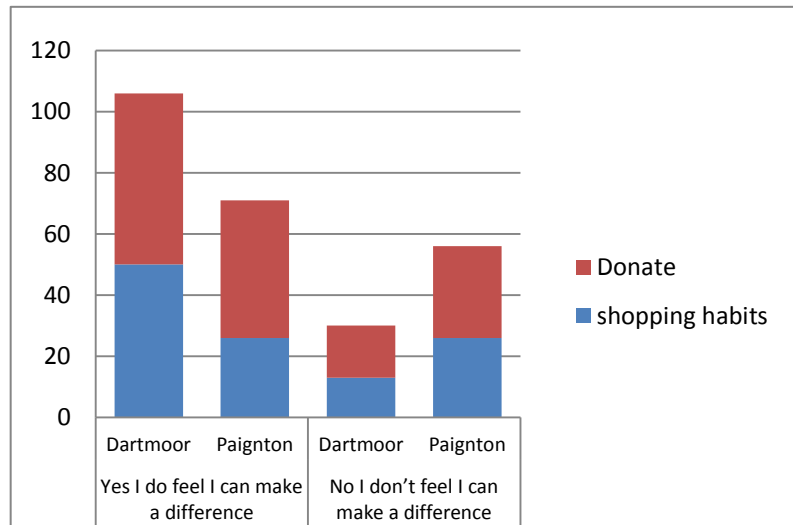


Figure 11. Impact of sense of helplessness/insignificance has on responses (maybe, probably and definitely) to the questions: are you more likely to donate and change

From figure 12 it is clear that peoples feeling of significance can be highly influenced from a visit to an ex-situ conservation attraction. The results imply that Eden Project participants felt more helpless, with 92/110 feeling that they couldn't make a difference, which is poor when compared to both Dartmoor (26/100) and Paignton (41/100). These graphs correlate with the negative response rate to question 6 open-ended part asking partakers how they can make a difference and if they don't feel they can make a difference, why not. With the majority of question 6 responses at Eden

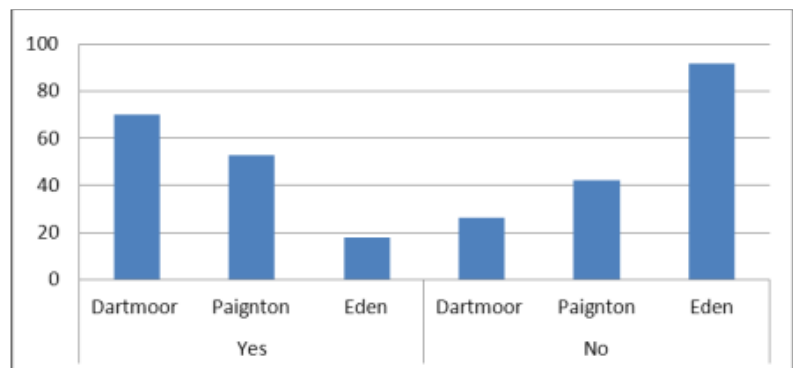


Figure 12. Responses to the question: 'Do you feel you can make a difference?' at each attraction.

being along the lines of: individuals are impotent with such large companies and governments with such power being the determinants. Such answers were apparent at the two zoos but not at such a large scale, with Paignton having this response greater than Dartmoor at 18%. Dartmoor zoo may have achieved better responses for question 6, with very few indicating any feeling of insignificance as Dartmoor Zoo as an establishment represents what an individual can do. With Dartmoor Zoo's owner heavily publicising his hardships to achieve what he has, also the zoo itself is quaint and non-commercialised, helping to reduce the feeling of insignificance.

4.8 The Relevance of Positive Communication

Whilst taking into consideration 15% of Dartmoor and 4% of Paignton participants did not answer the question ‘Are you more optimistic or pessimistic about the future of the natural world after today’s visit?’ From figure 13 it seems that

participants are equally optimistic after their visit at the zoos, however Paignton had 17% more pessimists than Dartmoor. However, it doesn’t seem that this has been the cause for Dartmoor’s better results in figure 12 (above showing Dartmoor Zoo participants felt they could make more of a difference). As tables 3 and 4 clarify that Paignton’s pessimists felt they could

make a difference more than the optimists by ~10%. The participants who felt they had more of a purpose were the visitors whose feelings were indifferent after visiting Dartmoor.

On the contrary, as shown in figure 13, no participants were optimistic after their visit to Eden which corresponds with the fact Eden had the worst results in relation to the feeling of helplessness, this could be due to the core dome at Eden as it creates a very depressing outlook of current environmental issues with little enthuses on solutions.

There was also no significant correlation between the questions ‘Are you more optimistic or pessimistic after your visit’ and the life-style changes questions for both zoos (Appendix D). Overall, suggesting that positive communication isn’t as important as previously believed.

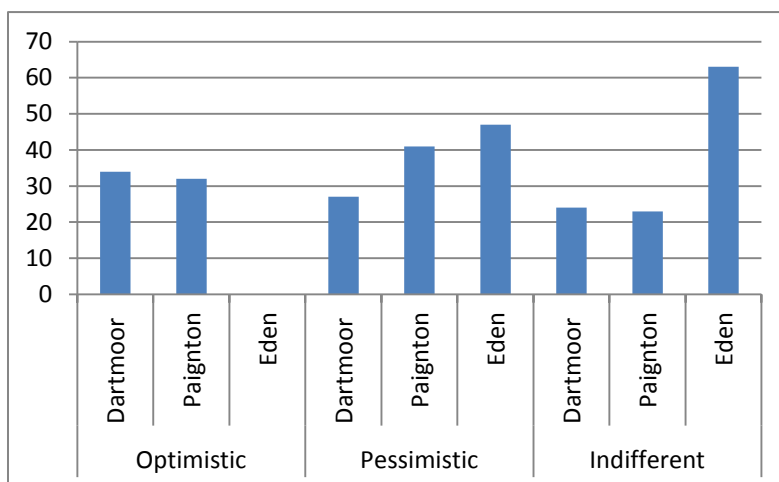


Figure 13. Responses at all three attractions for the question: ‘Are you more optimistic or pessimistic about the natural world’s future after today?’

Table 3. Comparison on the Dartmoor Zoo results of two questions: ‘Do you feel you can make a difference?’ and ‘Are you more optimistic or pessimistic about the natural world’s future after today?’

Dartmoor Zoo		Do you feel you can make a difference?	
		Yes	No
Are you more optimistic or pessimistic about the natural worlds future after today?	Optimistic	70.6%	26.5%
	Pessimistic	66.7%	33.3%
	Indifferent	87.5%	12.5%

Table 4. Comparison on the Paignton Zoo results of two questions: ‘Do you feel you can make a difference?’ and ‘Are you more optimistic or pessimistic about the natural world’s future after today?’

Paignton Zoo		Do you feel you can make a difference?	
		Yes	No
Are you more optimistic or pessimistic about the natural worlds future after today?	Optimistic	46.9%	40.6%
	Pessimistic	56.1%	41.5%
	Indifferent	56.5%	43.5%

5. Discussion

This study has been focusing on the factors that past research has concluded influences behaviour and attitude change among zoo visitors. Individually assessing the significance of each factor and identifying any relationships between them. In order to help identify necessary improvements such attractions should concentrate on and to gain further insight to zoos educational and conservation value. The findings are of high significance; here I will discuss and scrutinise the results in more detail and in relation to past data.

5.1 Overview on the Significance of the Factors of Influence

5.1.1 Classification

This study's results in relation to visitor perceptions on zoos were a lot more positive than Falk et al., (2007) results; where only 42% believed zoos play an important role. This could indicate changes in public attitudes or differing attitudes among nations with Falk's studies all established in the USA.

The fact that Paignton and Dartmoor zoo visitors are generally well educated is important as it affects the zoos learning outcomes in the results and also highlights the need for the zoos to sophisticate their learning material as Falk and Dierking (2000) state that the "Personal Context" of visitors is highly important in influencing visitor learning and also such information helps to identify the studied zoos impact on improving public knowledge and their ability to change behaviour and attitudes. Falk et al., (2007) research also confirmed that visitors bring higher than expected knowledge and this intern reduces any statistically significant changes in knowledge. Furthermore, Ballantyne, et al., (2008) and Falk et al (2007) input that in general, visitors to wildlife tourism experiences tend to be more knowledgeable and interested in environmental issues than the general public, indicating that the positive zoo attitudes found in such zoo data collection may not be appropriately representing the overall general public.

5.1.2 Motivation

There is correlation between this study and past literatures motivational findings; that people come mainly with a social group, and/or for fun/entertainment (Falk et al., 2007: Reade and Waran, 1996; Shackley, 1996). Suggesting that public perceptions of zoos are still focused on their entertainment potential, though Ballantyne and Packer (2002) suggest that such motivations are synergistic with educational impacts and visitors consider learning and discovery to be an integral part of the 'entertainment' provided and such attraction provide the public with a unique experience of "learning for fun".

Falk et al., (1998 & 2007 & 2009) and Ballantyne and Packer (2002) also concluded that motivations for visit impact how people conduct their visit and what they get out of it, which this study did not. This could be due to this study being significantly smaller and the season at which the questionnaires were completed and the that so few participants said that they came to learn, with only around 10% for both zoos making up for motivation for visit other than family day out or fun/entertainment, making the ability to establish any associations difficult.

What's more, the high percentage of family day out participants could negatively impact the learning outcomes of the results, as people with children have less time

and capability to read signs and be as receptive to messages (Ballantyne, et al., 2007). Yet the family day out participants were highly receptive to the information boards in Paignton.

5.1.3 Zoos Animal Collection

It is clear from the results that animal behaviour and species type have significant emotional value and are likely to be the cause for the zoos more positive changes in behaviour and attitude changes in comparison to Eden Project. The good animal husbandry practiced at both zoos is likely to result in the 'natural' behaviour observed at both zoos, which Ballantyne, et al., (2007) state is important to help foster positive attitudes towards the conservation of a species. This judgement is backed up by the high amount of Paignton Zoo responses stating negativity about the elephant, saying that they felt it was lonely and bored.

Paignton visitors favour in observing exhibits is very likely to be due to their large primate collection as another characteristic that attracts human attention is infancy (Ballantyne, et al., 2007) apparent in Paignton's primates and as past data also clarifies that relatable and natural animal characteristics, as well as active animals influence behaviour and attitude change (Altman, 1998; Bitgood et al., 1988). After all, visitors stay longer at the exhibits of more active animals (Jackson, 1994; Johnston, 1998; Anderson, et al., 2003), and are therefore more likely to acknowledge the information signs. This helps rationalise Paignton's high response to the value of their information boards and general educational outcome.

Myers et al. (2004) study at Brookfield Zoo reiterates the changes on impacts due to animal types, saying that the animals that had the greatest emotional impact were those that visitors felt an connection/empathy towards, with the gorilla in this study holding the greatest emotional appeal and was what visitors would most wish to preserve, similar results were found in Orams, (1994); Shackley, (1996); Woods, (2000). Research also suggests that rarity, size, symbolic status and endangered status also influences visitor satisfaction (Moscardo et al., 2000) and this corresponds with the open ended question 9a&b responses.

5.1.4 Learning techniques

One reasoning for Dartmoor's significantly higher educational role than Eden and Dartmoor's matching results with Paignton in relation to behaviour and attitude changes is because of the zoo's emphasise on oral presentations and close encounters as they have been evaluated as effective tools for achieving recreational and educational goals in past literature: Heinrich and Birney, (1992); Swanagan, (1993), (2000); Yerke & Burns, (1991). In fact all past studies researched found increased support for conservation efforts and improvements in knowledge from such experiences than just passively viewing exhibits: Swanagan (1993), (2000); Yerke and Burns, (1991); Kidd and Kidd (1997); Swanagan, (2000); American Zoo and Aquarium Association, 2003; Bielick and Doering, (1997); Borun and Dritsas, (1997). Furthermore, visitors are more capable of retaining information from an oral presentation (Heinrich & Birney, 1992) and they prevent the transmission of inaccurate information (Anderson, et al., 2003).

The added benefits from exclusively close encounters have been reiterated in past literature, as Milson (1990) study states that direct contact with snakes was more effective in changing visitors' attitudes than merely exposing visitors to the animal or

providing information. Also, such practices help in presenting animals as individuals, for instance, Gates and Ellis, (1999) found was an effective factor in influencing attitudes.

Moreover, the presence of staff helps with information retention and animal perceptions (Anderson, et al., 2003) as well as increasing the likelihood of long-term changes to visitor behaviour; encouraging reflective response to the experience (Ballantyne, et al., 2010). Besides, visitors want to interact with staff members (Broad, 1996; Wolf and Tymitz, 1980), and volunteers were generally present far more in Dartmoor Zoo.

Visitors positive views of zoos in comparison to past research is likely to be due to the good animal keeping conditions, with natural exhibits which WAZA, (2011) highly recommend for educational and attitude purposes, as the appearance of food trays and bars etc. can confuse the intended message (WAZA, 2011). A 1989 study found that zoos that displayed animals in authentic environments had a positive impact on visitors' attitudes towards wildlife (Kellert and Dunlap, 1989). The acceptability of exhibits is important as negative impressions of zoos will result in them being undervalued, underfunded and thus underachieving in their goals.

My study highlights the importance of information boards which seems to have been neglected in past literature; that perceive information boards as ineffective learning techniques though it is clear that Paignton Zoos play a significant role in improving conservation awareness, mentioned in results.

5.1.5 Communication

There is a significantly higher sense of personal importance for the natural world in the two zoos in comparison to Eden Project. This is likely to be due to the fact that viewing rare/impressive/foreign animals in zoos is self-explanatory; people easily make the connection when viewing these animals that their existence is threatened. Concluding that zoos are more cognitive in expressing messages, with the viewing of such animals' first hand creating emotion. There is a correlation between the emotional impact of the zoo visits and the results for how important individuals perceive the natural world to be in this study. This may justify why Dartmoor Zoos results for question 3 are similar to Paignton Zoos, although Dartmoor Zoo puts far less emphasis on conservation issues throughout the park. Another justification however is Dartmoor Zoos emphasis on talks and close encounter and presence of staff; as such practices can help stress the value of nature (WAZA, 2005). Kaplan and Kaplan (1983) discovered that allowing visitors to interact with each other is key in behaviour and attitude change as it allows visitors to participate physically and cognitively, increasing interest and retaining such outlooks for longer. Understanding the importance of nature is vital for influencing behaviour change according to (Rogers and Prentice-Dunn, 1997). Furthermore, there is a correlation in this study; with the majority of Eden participants not thinking they can make a difference and not believing the loss of the natural world is as significant as the zoo participants did.

The incapability of botanical gardens to cognitively express conservation messages is further upheld by past research by Connell and Meyer (2004) and Bennett and

Swasey (1996) finding that botanical garden visitors' reasons for visiting are mainly to enjoy and admire the outdoors, a place to relax and enjoy with friends and family.

This study's results further imply that the feeling of helplessness does have an impact on behaviour change (results section 4.7). Past research backs this up, stating that the necessity of emphasising the importance of individuals is critical to the effectiveness of such learning institutions, as it reduces the feeling of novelty and focuses visitors attention on the main message (Falk et al, 1978; Kaplan, 1990; Folz, 1991; Rogers and Prentice-Dunn 1997) and WAZA 2005 conference permits that such institutions demonstrate the relevance of individual actions, making it easy for people to make life style changes and all zoos should thank visitors for their support. The last point is easier to carry out through interactive learning techniques that involve staff members, once again justifying Dartmoor's similar score to Paignton. Oram (1996) states that visitors must be convinced and persuaded in a voluntary manner that adopting conservation behaviour will halt or reverse environmental damage. Yalowitz (2004) goes on to say that 'one of the main challenges wildlife attractions face is to convince people that individual actions have the potential to conserve the earth's resources for future generations. My results support this with a significant amount of participants stating that they felt insignificant with all the worlds super powers, Monroe and DeYoung (1993) got the same response with participants believing that it was someone else's job e.g. government and industry etc.

Another clear barrier preventing the adoption of sustainable life-style initiatives from this study is convenience, with participants implying that they were more likely to make the simpler changes and/or ones that they benefit from or are going to enjoy (such as visiting other zoos). McKenzie-Mohr and Smith (1999) Community Based Social Marketing Theory proposes that messages need to target the perceived barrier that prevent adoption and to stress the benefits of performing the desired behaviours.

The results for the significance of positive communication among Dartmoor and Paignton does not correspond with past research stating that it is of high importance, with pessimism found to encourage the sense of helplessness, reducing peoples intentions on changing their behaviour (Hayward, 1998; Yalowitz, 2004; Monroe and DeYoung, 1993; Manubay et al, 2002, Ballantyne, et al., 2007).

Paignton and Eden Project from the observations are also clear role models for sustainable initiatives, but this has not impacted any change in participants' behaviour and attitudes, further implying that people are aware of what they can do, but need personal incentive.

5.2 Zoos Educational Value

It is impossible to accurately identify zoos educational value; Dartmoor Zoo and Paignton Zoo comparison reveal differences, but it is clear from past research that free-choice learning establishments are important facilities in reducing ignorance in a way which is more salient in visitor's minds. Also, zoos are vital in that they are unique in their ability to create an emotional impact, which this study identifies as an important influencer for participants to absorb knowledge. Ballantyne et al., (2001) and Myers et al., (2004) also state that education literature suggests that emotions

influence conservation learning. The results did further clarify that the zoo visitors had positive perceptions on the conservation value of zoos, implying that the zoos are achieving their conservation awareness goals.

5.3 Zoos Conservation Value

The partakers in Dartmoor Zoo and Paignton Zoo clearly showed interest in changing behaviour, even when considering the variable of feeling compelled into answering as they did due to their apparent approval of zoos. Falk et al., (2007) study results are also in favour of zoos for their conservation value as 61% of visitors found their experience supported and reinforced their values and attitudes towards conservation and visits prompted 54% of individuals to reconsider their role in environmental problems and conservation action, and see themselves as part of the solution and 57% said their visit strengthened their connection to nature.

Zoos are likely to increase visitors interest in nature influencing what they read and watch on TV and enlighten people with options in changing aspects of their life, encouraging visitors to visit like institutions reinforcing conservation messages (Dierking et al, 2002), and accordingly participants scored enthusiastically in this study saying that they are likely to visit other conservation attractions. Such attractions are also capable of providing other post-visit experiences (e.g. take-home activities, books, websites and events) (Adelman et al., 2000). The longitude of the impact of visiting such attraction is of high importance, as previous studies find that only a minority of initial attitude and behaviour attentions translate into real actions and such experiences need to be reinforced (Ballantyne and Packer, 2011; Adelman et al., 2000; Dierking et al. 2004; Rickinson 2001; Hwang, et al., 2000; Stern and Oskamp 1987; Hungerford and Volk, 1990). More specifically Ballantyne and Packer (2011) found that only 7% participants had taken environmental actions four months later, however it can also be argued that it is still something.

5.4 Recommendations

5.4.1 Literature Review and Result Comparisons

Past data supporting the 11 factors that inspire conservation should not be dismissed although some did not appear to have any significance in this data, as all 11 factors are important to help promote zoos as respectable establishments and if the zoos did not attempt complying with them then the results could have been significantly different in a negative direction.

The results do however supplement past data in many factors, such as that zoos have two dominant groups for visitor motivation (Falk et al., 2007). Therefore, it is advised that the zoos cater for these two dominant groups: The second most dominant group in this study was the same for Falk et al., (2007); fun and entertainment. Falk described these participants in his study as explorers, it was identified that such visitors were mainly interested in seeing the animals and the interpretation. Falk goes on to say that 'Zoos and aquariums need to provide Explorers with new or surprising offerings, such as temporary exhibits or in-depth programs and create more challenging experiences.' Facilitators were the most popular group in Falk et al., (2007) study and this result is consistent with this study (family day out visitors). Falk's study concluded that 'Facilitators desire a social experience aimed at the satisfaction of someone else.' Therefore the zoos need to

offer opportunities for social interaction; opportunities to talk to staff; and provide places for regrouping and processing/reflecting of their visit.

Throughout the study it has been reiterated, the importance of interaction; Swanagan (1993, 2000) for example proved that live demonstrations improved support for conservation efforts in comparison to passive viewing. However, Swanagan (1993, 2000) also disproved the effectiveness of information boards, which this study contradicts.

Agreeing with past literature, visitors are generally smart and knowledgeable about the environment and material found at the zoos are likely to be too simplistic, a concern that was brought to attention in the WAZA 2011 conference, where it was criticised that 'material found at zoo exhibits is simplistic – at most.'

Long-term initiatives need to be considered to increase chances of genuine behaviour changes, as without intervening treatment initial conservation actions decline over time (Hungerford and Volk, 1990), such initiatives include:

- Zoo events (Ballantyne and Packer, 2011)
- Web-based materials – encouraging responsible decision making regarding issues highlighted on-site and provide motivation for appropriate behavioural responses (Ballantyne and Packer, 2011). Reiterating on-site experiences contemplates the factor of influence, familiarity. Motivations to promote learning online include offers such as completing an online quiz and getting half price entry at next visit, or an online monthly article on zoo updates.
- On-site take home learning material (Ballantyne and Packer, 2011).
- Gift shop initiatives – selling souvenirs with a prominent conservation message, eco-labelled products, gift shop bags that reinforce a conservation message

Although Paignton and Eden are clear role models for sustainability, this hasn't seemed to have paid off in the results. However, it is recommended by WAZA (2011) that such initiatives are apparent for zoos reputation and that more entuses needs to be employed in zoos, as refugees for urban or rural wildlife.

The sense of helplessness is the only form of communication that impacts behaviour change in this study. To reduce the sense of helplessness Hayward (1998) advises that when highlighting sad environmental issues that solutions and positive stories need to be clearly apparent. Otherwise the visitors increased awareness can be counter-productive, as it erodes individual's confidence in tackling such issues.

The open-ended questions made it apparent that animal welfare and behaviour does have an emotional impact and that emotions are an important factor in improving zoos educational and conservational value. It is clear that visitors care about animals and therefore it is important that animal welfare standards and how the zoos care for the animals is clearly explained, with emphasise on any relevant conservation action; suggestions which have been reiterated by Falk et al., (2007) findings.

5.4.2 Paignton Zoo and Dartmoor Zoo Recommendations from Data

Table 5. Recommendations for improvements in Paignton and Dartmoor Zoo from this

Paignton Zoo	Dartmoor Zoo
Explanation for elephant.	Improve information signs and add additional signs on conservation issues and welfare and enrichment.
Talks later in the day.	When expanding animal collection primates are advised.
Close encounters throughout year.	Additional close encounters earlier on in the day.
Have regular visitors so need to alternate displays and promote new visitors.	Improve playground and improve/add additional areas for regrouping and reprocessing of visit.
Presence of volunteers/staff.	Sheltered areas at enclosures and information signs.
Education room open all year round.	More environmentally friendly products in gift shop.
Reduction in commercialised presence	Presence of sustainable initiatives.
Both	
More information present on conservation issues that are less simplistic, publicising more covert issues.	
Increase emphasise on necessity of life-style changes and positive conservation stories.	
Cater for family day out and fun/entertainment motivated visitors.	
Introduce further long-term initiatives (mentioned 5.4.1)	
Best learning techniques to focus on: close encounters, talks, enclosures/species, and information boards.	

5.5 Limitations

Beneficial and valuable findings have resulted from this study, however all results should be taken with caution. For questionnaires have many validity threats, one being demand characteristics; Marino, et al (2010) provides one example of participants' tendencies to alter their responses in accordance to what they think the researcher wants.

Other variables that need to be taken into consideration is the environment in which participants are completing the questionnaire, for the majority of participants in Dartmoor Zoo were partaking in the questionnaire outside (in winter), which increases the likely hood of rushed responses. Also, it was noted that participants in Paignton that sat on the bench spent more time on the questionnaire than participants standing up.

Responses are also determined by visitors regularity to such attractions, with the majority of Paignton visitors being regulars and are therefore likely to be biased for

Paignton, however Ballantyne, et al., (2008) also discovered that first time visitors are more motivated by learning and discovery, which if right gives Dartmoor Zoo an advantage. This may poorly represent the effectiveness of specific learning techniques, along with the inability to know whether certain learning techniques were not marked, due to poor timing by visitors to displays or talks etc. and learning is further dependant on physical, social and personal context of their visit (Falk and Dierking, 2000). For example, a number of participants at Dartmoor Zoo left before close encounters and straight after the big cat talk, and people are more likely to say what they saw most of or what they saw last which again doesn't clarify what learning technique is the most effective.

Negligibility in question responses is apparent in question 3b with the results being inconsistent with other question responses (explained in section 4.5).

What further needs to be taken into consideration is that the majority of the questionnaires completed are very likely to be representing what the public already know or feel, for visitors already have a high regard for nature, and are likely to not be answering in relation to what they have gained from their visit, which is what has been asked for in certain questions.

Furthermore, the retrospective-pre method has faults such as recall bias, whereby participants are unable to accurately recall attitudes held in the past. In addition to effort justification, which is when people will answer questions to justify time and energy invested in the experience. What's more the retrospective-pre method causes cognitive dissonance where by partakers are reporting improvements or change even if it did not occur, to ease internal conflict due to their expectations that changes should have occurred (Marino, et al., 2010).

In relation to the responses' towards behaviour change consideration is needed for the novelty effect (Marino, et al., 2010) as Research by Dierking et al. (2004) suggests that conservation intentions can be short-lived and are not necessarily matched by subsequent actions.

Directed specifically towards this study further is the size limitation of the data collection. For in comparison to past data there is a limited number of participants, and therefore it is hard to clarify the accuracy of the conclusions met in relation to the significance of the eleven factors that influence inspiration for conservation. Another size limitation is that visitor classifications and motivations etc. are heavily determined by seasonality at such attractions and this study was carried out in the winter months of December and January only.

5.6 Improvements

Though the outcome of this study is adequate, there are a few changes which if met may have improved the results. Firstly, validity of conclusions could be improved by a larger study, asking more participants at each attraction, all year round. Furthermore, to gain a greater retrospect of visitor classification at the days of data collection a refusal log, as advised by Marino, et al. (2010) would have been valuable.

Observational improvements could have been made through a formal evaluation of all the zoos talks, comparing data results depending on the days of collection and that days quality of talks, to help clarify learning technique (question 10a and b) results and to identify specific improvements that can be met in such practices.

A long-term study to find out whether behaviour and attitude changes persist over time is highly recommended in previous literature. This can be accomplished through asking for a form of contact on the questionnaire and asking a few months later the same questions and for recall of their visit; Falk et al's.(2007) study represents the usefulness of such efforts.

Improvements could be made to the questions themselves, as participants slacked in the completion of the open-ended questions, this may be due to the topics being quite broad and taking more time to complete than the close-ended questions. Question 5 took a significant amount of time for visitors as well and this is likely to have caused negligibility in partakers answering. Furthermore, it seems important from the study to make it clear to circle only one choice for question 1, 2, 10A&B. Also, wording on questions 2 and 5 needs improving to make it clear that answers need to be representing outcomes from the visit and not pre-visit knowledge or attitudes.

6. Conclusion

Despite the limitations of the study, valuable outcomes have been achieved. It has given greater insight into variables that impact visitor behaviour and attitudes, as well as highlighting other factors of influence that have not been considered or have been disregarded in past literature. For example, Paignton and Dartmoor Zoo being complete opposites in appearance and profits has made it apparent that visitors prefer non-commercialized surroundings. Therefore, this can initiate reasoning for future research into the importance of this factor. Linking to this finding is that it is clear that the financially demanding experiences offered at Paignton are not necessary for zoos to accomplish their conservation and educational goals. The best learning techniques perceived by participants were close encounters, talks, enclosures/species type and information boards. What's more, the high regard for information boards in Paignton contradicts past data, therefore this discovery is notable and is need of further investigation.

Another significant finding is the importance of helplessness, which supplements past research, emphasising the importance for ex-situ conservation attractions to reduce this feeling. After all, this study also accentuated the importance of creating emotion, especially that created by the presence of fauna as Eden didn't have the same emotional effect and this correlates with its overall poor results in comparison to the zoos.

Additional research to be taken into consideration is to compare zoos with other ex-situ conservation attractions (aquariums, museums, national parks) and also to focus on singular factors of influence at a time. Such as familiarity, as this appears to be a visible factor of influence for Paignton and Dartmoor Zoo in this study.

Overall, there is need for further research into this topic, as it is evident that such studies can provide valuable guidance to such establishments, and current available research hasn't exuded its potential.

7. References

- Adelman, L. M., Falk, J. H. and James, S., (2000). Assessing the National Aquarium in Baltimore's impact on visitors' conservation knowledge, attitudes and behaviours. *Curator*, 43, pp.33-61.
- Altman, J. D., (1998). Animal activity and visitor learning at the zoo. *Anthrozoos*, 11(1), pp. 12-21.
- American Zoo and Aquarium Association., (2003). Program animal position statement. Available online at: <http://www.aza.org/ConEd/proganimalposition> (accessed: 5/1/2012).
- Anderson, U.S., Kelling, A. S., Pressley-Keough, R., Bloomsmith, M. A. and Maple, T. L., (2003). Enhancing the zoo visitor's experience by public animal training and oral interpretation at an otter exhibit. *Environment and Behaviour*. 35(6), p.826.
- Australian Bureau of Statistics., (2007). Arts and culture in Australia: A statistical overview. Available online at: <http://www.abs.gov.au/ausstats/abs@.nsf/7d12b0f6763c78caca257061001cc588/5e1b001d91721f49ca2572a400753ae4> (accessed: 15/12/2011).
- Ballantyne, R. and Packer, J., (2002). Nature-based excursions: School students' perceptions of learning in natural environments. *International Research in Geographical and Environmental Education* 12, no. 1: 1–19.
- Ballantyne, R. and Packer, J., (2005). Promoting environmentally sustainable attitudes and behaviour through free-choice learning experiences: What is the state of the game? *Environmental Education Research*, 11(3), pp.281–295.
- Ballantyne, R. and Packer, J., (2011). Using tourism free-choice learning experiences to promote environmentally sustainable behaviour: the role of post-visit 'action resources'. *Environmental Education Research*, 17(2), pp.201-215.
- Ballantyne, R., Fien, J. and Packer, J., (2001). School environmental education programme impacts upon student and family learning: a case study analysis. *Environmental Education Research*, 7(1), pp.23–37.
- Ballantyne, R., J. Packer, J. and Sutherland, L., (2010). Visitors' memories of wildlife tourism: Implications for the design of powerful interpretive experiences. *Tourism Management*, 32(4), pp.770–79.
- Ballantyne, R., Packer, J, and Hughes, K., (2008). Environmental awareness, interests and motives of botanic gardens visitors: Implications for interpretive practice. *Tourism Management*, 29(3), pp.439-444.
- Ballantyne, R., Packer, J., Hughes, K. and Dierking, L., (2007). Conservation learning in wildlife tourism settings: lessons from research in zoos and aquariums. *Environmental Education Research*, 13(3), pp.367-383.
- Baratay, E. and Hardouin-Fugier, E., (2002). *Zoo: a history of zoological gardens in the west*. London: Reaktion Books.

Bennett, E. S. and Swasey, J. E., (1996). Perceived stress reduction in urban public gardens. *HortTechnology*, 6(2), pp.125–128.

BGCI., (2010). Definition of a botanic garden'. Available online at: <http://www.bgci.org/resources/1528/> (accessed: 23/11/2011).

Bielick, S. and Doering, Z. D., (1997). An assessment of the “think tank” exhibition at the national Zoological Park. (report No. 97-1). Washington D.C.: Smithsonian Institution.

Bitgood, S., Patterson, D. and Benefield, A., (1988). Exhibit design and visitor behavior: Empirical relationships. *Environment and Behavior*, 20(4), pp.474-491.

Borun, M. and Dritsas, J., (1997). Developing family-friendly exhibits. *Curator: The Museum Journal*, 40(3), pp.178-196.

Broad, G., (1996). Visitor profile and evaluation of informal education at Jersey Zoo. *Dodo Journal of the Wildlife Preservation Trusts*, 32, pp.166-192.

Bullough, W. S. and Hamilton, F., (1976). The role of education. In the zoological society of London 1826-1976 and beyond (the proceedings of a symposium held at The Zoological society of London on 25 and 26 March 1976), ed. L. Zuckerman. London: Academic Press, pp.223-231.

Butler, R.W., (1999). Sustainable tourism: A state-of-the-art review. *Tourism Geographies*, 1(1), pp.7–25.

Connell, J. and Meyer, D., (2004). Modelling the visitor experience in the gardens of Great Britain. *Current Issues in Tourism*, 7(3), pp.183–216.

Connell, J., (2004). The purest of human pleasures: The characteristics and motivations of garden visitors in Great Britain. *Tourism Management*, 25, pp.229–247.

Connell, J., (2005). Managing gardens for visitors in Great Britain: A story of continuity and change. *Tourism Management*, 26(2), pp.185–201.

Darwin-Edwards, I., (2000). Education by stealth: The subtle art of educating people who didn't come to learn. *Roots*, 20, pp.37–40.

Dierking, L. D., Adelman, L. M., Ogden, J., Lehnhardt, K., Miller, L. and Mellen, J. D., (2004). Using a behaviour change model to document the impact of visits to Disney's Animal Kingdom: a study investigating intended conservation action. *Curator*, 47(3), pp.322–343.

Dierking, L. D., Burknyk, K., Buchner, K. S., and Falk, J. H., (2002). Visitor learning in zoos and aquariums: a literature review. Annapolis, MD: Institute for Learning Innovation.q

Dodd, J., and Jones, C., (2010). Redefining the role of botanical gardens – Towards a new social purpose. University of Leicester.

Ebersole, R.S., (2001). The new zoo. Available online at: <http://magazine.audubon.org/features0111/newzoo.html> (accessed: 5/1/2012).

EC., (1999). Council Directive 1999/22/EC of March 29, 1999 Relating to the Keeping of Wild Animals in Zoos. Official Journal of the European Communities.

Eden Project., (2011). Available online at: http://www.edenproject.com/come-and-visit/whats-here?qclid=CJH0q7DWyK4CFelmtAodcEBc_Q (accessed: 15/12/2011).

Falk, J. H. and Dierking, L. D., (2000). Learning from museums: visitor experiences and the making of meaning. Walnut Creek, CA: AltaMira Press.

Falk, J. H., Moussouri, T. and Coulson, D., (1998). The effect of visitors' agendas on museum learning. *Curator*, 21(2), pp.106-120.

Falk, J., Martin, W. and Balling, J., (1978). The novel field trip phenomenon: adjustment to novel settings interferes with task learning. *Journal of Research in Science Teaching*, 15, pp.468-472.

Falk, J.H. and Dierking, L.D., (2002). Lessons without limit: How free-choice learning is transforming education. Walnut Creek, CA: AltaMira Press.

Falk, J.H., Heimlich, J.E. and Foutz, S., (2009). Free-choice learning and the environment. Lanham, MD: AltaMira Press.

Falk, J.H., Reinhard, E.M., Vernon, C.L., Bronnenkant, K., Deans, N.L. and Heimlich, J.E., (2007). Why zoos & aquariums matter: Assessing the impact of a visit to a zoo or aquarium. Silver Spring, MD: Association of Zoos & Aquariums.

Folz, D. H., (1991). Recycling program design, management and participation: a national survey of municipal experience. *Public Administration Review*, 51(3), pp.222-223.

Gates, L. J. and Ellis, J. A., (1999). The role of animal presentations in zoo education. *International Zoo News*, 46(6), pp.7-9.

Hancocks, D., (2001). A different nature: the paradoxical world of zoos and their uncertain future. Berkeley: University of California Press.

Hassan, S., (2000). Determinants of market competitiveness in an environmentally sustainable tourism industry. *Journal of Travel Research*, 38, pp.239-45.

Hayward, J., (1998). Summative evaluation: Visitors' reactions to *Fishing for Solutions*. Northampton, MA: People, Places and Design Research.

Heinrich, C.J., and Birney, B.A. (1992). Effects of live animal demonstrations on zoo visitors' retention of information. *Anthrozoos*, 5(2), pp.113-121.

Hensel, K.A., (1978). Education in zoos and aquariums – trends and projections. In American association of Zoological parks and aquariums annual conference proceedings 1978. pp.117-124.

Hungerford, H.R. and Volk, T.L. (1990). Changing learner behavior through environmental education. *Journal of Environmental Education*, 21, pp.8-21.

- Hwang, Y., Kim, S. and Jeng, J. (2000). Examining the causal relationships among selected antecedents of responsible environmental behaviour. *Journal of Environmental Education*, 31(4), pp.19–25.
- IUDZG/CBSG., (1993). *The World Zoo Conservation Strategy: the Role of Zoos and Aquaria of the World in Global Conservation*. Brookfield, IL: Chicago Zoological Society.
- Jackson, D.M., (1994). Animal activity and presence of docent interaction: Visitor behavior at Zoo Atlanta. *Visitor Behavior*, 9(1), pp.16.
- Jacobson, S., (1999). *Communication skills for conservation professionals*. Washington, D.C.: Island Press.
- Johnston, R.J. (1998). Exogenous factors and visitor behavior: A regression analysis of exhibit viewing time. *Environment and Behavior*, 30(3), pp.322-347.
- Kaplan, S and Kaplan. R., (1983). *Cognition and Environment: Functioning in an uncertain world*. New York: Praeger.
- Kaplan, S., (1990). Being needed, adaptive muddling and human-environment relationships. EDRA 21. In *Proceedings of the Twenty-First Annual Conference of the Environmental Design Research Association*. Oklahoma City, OK: EDRA.
- Kellert, S.R. and Dunlap, J., (1989). Information learning at the zoo: A study of attitude and knowledge impacts. Philadelphia: zoological society of Philadelphia.
- Kidd, A.H. and Kidd, R.M., (1997). Aquarium visitors' perceptions and attitudes toward the importance of marine biodiversity. *Psychological Reports*, 81, pp.1083-1088.
- Liu, Z., (2003). Sustainable tourism development: A critique. *Journal of Sustainable Tourism*, 11(6), pp.459–75.
- Malamud, R., (1998). *Reading zoos: representations of animals and captivity*. New York: New York University Press.
- Manubay, G., Smith, J.C., Houston, C., Schulz, K., Dotzour, A. and De Young, R., (2002). *Evaluating Exhibits that Promote Conservation Behaviour: Developing a Theoretical Framework*. School of natural resources and environment. University of Michigan.
- Marino, L., Lilienfeld, S.O., Malamud, R., Nobis, N. and Brogliod, R., (2010). Do zoos and aquariums promote attitude change in visitors? A critical evaluation of the American zoo and aquarium study. Leiden, Koninklijke Brill NV.
- Marshall, A., (1996). Myths of ecotourism making industry miss a major market. *Hotel and Motel Management*, 211(19), pp.15–16.
- Mason, P., (2000). Zoo tourism: the need for more research. *Journal of Sustainable Tourism*, 8(4), pp.333–339.
- McCracken, D.P., (1997). *Gardens of Empire: Botanical Institutions of the Victorian British Empire*. London and Washington: Leicester University Press.

McKenzie-Mohr, D. and Smith, W., (1999). *Fostering sustainable behaviour: An introduction to community-based social marketing*. Gabriola Island: New Society Publishers.

Milson, J.L., (1990). Museums, zoos and aquariums partners in teaching and learning. *Education*, 110(4), pp.521–526.

Mintz, S. and Rode, S., (1999). More than a walk in the park?: Demonstration carts personalize interpretation. *Roots*, 18, pp.24–26.

Monroe, M. and DeYoung, R., (1993). Designing programs for changing behaviour. In *American Association of Zoological Parks and Aquariums Annual Conference Proceedings 1993*. pp.180-187.

Moscardo, G., Woods, B. and Greenwood, T., (2000). Understanding visitor perspectives on wildlife tourism fact sheet. Available online at: <http://www.crctourism.com.au/CRCbookshop/Documents/Factsheets/ENV002Visitors%20.pdf/> (accessed: 15/01/2012).

Myers, O.E., Saunders, C.D. and Birjulin, A.A., (2004). Emotional dimensions of watching zoo animals: an experience sampling study building on insights from psychology. *Curator*, 47(3), pp.299–321.

Nickerson, R.S., (2003). *Psychology and environmental change*. Mahwah, NJ: Lawrence Erlbaum.

Orams, M. (1996) Using interpretation to manage nature-based tourism. *Journal of Sustainable Tourism*, 4(2), pp.81–94.

Orams, M., (1994). Creating effective interpretation for managing interaction between tourists and wildlife. *Australian Journal of Environmental Education*, 10, pp.21–34.

Paignton Zoo., (2011). Available online at: <http://www.paigntonzoo.org.uk/index.php> (accessed: 15/12/2011)

Reade, L.S., and Waran, N.K., (1996). The modern zoo: How do people perceive zoo animals? *Applied Animal Behaviour Science*, 7(1-2), pp.109-118.

Rhoads, D.L. and Goldsworthy, R.J., (1979). The effects of zoo environments on public attitudes toward endangered wildlife. *International Journal of Environmental Studies*, 13, pp.283-287.

Rickinson, M., (2001). Learners and learning in environmental education: A critical review of the evidence. *Environmental Education Research*, 7(3), pp.207–320.

Rogers, R.R. and Prentice-Dunn, S., (1997). Protection motivation theory. In *Handbook of health behaviour research*, ed. D.S. Gochman, 1, pp.113–32. New York: Plenum Press.

Saunders, D.L., (2007). Making public the private life of plants: The contribution of informal learning environments'. *International Journal of Science Education*, 29(10), pp.1209-1228

Scott, W. and Gough, S., (2004). Key issues in sustainable development and learning: A critical review. London: RoutledgeFalmer.

Seidensticker, J. and Lumpkin, S., (1991). Great Cats. Emmaus, PA: Rodale Press.

Shackley, M., (1996). Wildlife tourism. London: Thompson Business Press.

Shettel-Neuber, J., (1988). Second-and third-generation zoo exhibits: a comparison of visitor, staff, and animal responses. *Environment and Behavior*, 20(4), pp.452–473.

Singleton, I., (2001). Dolphin mania. Sydney: Singing Nomads Productions, Beyond Distribution Pty Ltd.

Stern, P.C. and Oskamp, S. (1987). Managing scarce environmental resources. In *Handbook of environmental psychology*, ed. D. Stokols and I. Altman, 2, pp.1043–88. New York: John Wiley.

Stoinski, T.S., Lukas, K.E. and Maple, T.L., (1998). A survey of research in North American Zoos and Aquariums. *Zoo Biology*, 17, pp.167-180.

Swanagan, J.S., (1993). An assessment of factors influencing zoo visitors' conservation attitudes and behavior. Atlanta, GA: Georgia Institute of Technology.

Swanagan, J.S., (2000). Factors influencing zoo visitors' conservation attitudes and behavior. *Journal of Environmental Education*, 31(4), pp.26-31.

Tarrant, M.A. and Cordell, H.K., (2002). Amenity values of public and private forests: Examining the value–attitude relationship. *Environmental Management*, 30(5), pp.692–703.

Tompson, C.G., (1989). Hope for the future: strategies for effective conservation education. *Zoo Biology*, 8(1), pp.171-175.

WAZA., (2005). Building a future for wildlife – the world zoo and aquarium conservation strategy. Berne, Switzerland: WAZA Executive Office.

WAZA., (2011). Biodiversity is Life: Proceedings of the 65th Annual Conference. Cologne.

Willison, J. (1997). Botanic gardens as agents for social change. In *Kings Park and botanic garden conservation into the 21st century: Proceedings of the fourth international botanical gardens conservation congress, 25–29 September, 1995, Perth*, pp. 339–344.

Wilson, N., (2006). Stern warning, but no carbon copy. *The Weekend Australian*, November 4-5.

Wolf, R.L., and Tymitz, B.L., (1980). Studying visitor perceptions of zoo environments: A naturalistic view. *Zoo Display and Information Techniques*, 21, pp.49-53.

Woods, B., (2000). Beauty and the beast: preferences for animals in Australia. *The Journal of Tourism Studies*, 11(2), pp.25–35.

Yalowitz, S.S., (2004). Evaluating visitor conservation research at the Monterey Bay Aquarium. *Curator*, 47(3), pp.283–297.

Yerke, R. and Burns, A., (1991). Measuring the impact of animal shows on visitor attitudes. In *American Association of Zoological Parks and Aquariums 1991 Annual Conference Proceedings*, pp. 532-539. San Diego, CA: American Association of Zoological Parks and Aquariums.

Zimmermann, A., Hatchwell, M., Dickie, L. and West, C., (2007). *Zoos in the 21st century – catalysts for conservation?* UK: Cambridge University Press.

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