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ACRONYMS AND ABBREVIATIONS

CBD

The Convention on Biological Diversity

COP

Conference of the Parties

EEASA

Environmental Education Association of Southern Africa

ESD

Education for Sustainable Development

IUCN

International Union for the Conservation of Nature

IFAW

International Fund for Animal Welfare

IZE

International Zoo Educators Association

KDC

Disney Animal Kingdom Kids' Discovering Clubs

LPI

Living Planet Index

MZS

Malaysian Zoological Society

MAZPA

Malaysian Association of Zoological Parks and Aquaria

NZG

National Zoological Gardens of South Africa

SADEC

Southern African Development Community

SEAZA

East Asia Zoo Association

UNCED

United Nations Conference on Environmental and Development

UNEP

United Nations Environment Programme

UNESCO

United Nations Educational, Scientific and Cultural Organization

UWEC

Uganda Wildlife Education Centre

PAAZAB

African Association Of Zoos And Aquaria

R&S

The Jane Goodall Institute's Roots and Shoots

WWF

World Wide Fund for Nature

WAZA

World Association of Zoos and Aquariums

WCS

Wildlife and Conservation Society

WCU

Wildlife Clubs of Uganda

WZCS

World Zoo Conservation Strategy

CHAPTER ONE

THE INTRODUCTION TO THE STUDY

*The clearest way into the universe
is through a forest wilderness.*

- John Muir -

1.1 Introduction

On 24 December 1968 Apollo 8 crewmember, Bill Anders, took the now famous Earthrise picture, showing the earth seemingly rising above the lunar surface (National Aeronautics and Space Administration, n.d.). This picture provided the first ever view of Planet Earth. In the two generations since, the world has moved from ecological credit to ecological deficit (World Wide Fund for Nature, 2008:1). . One of the longest-running measures of the trends in the state of global biodiversity, the World Wide Fund for Nature's Living Planet Index (LPI), shows a consistent overall trend in the state of global biodiversity since the first Living Planet Report was published in 1998: a global decline of almost 30% between 1970 and 2007 (World Wide Fund for Nature, 2010:6). The 2008 World Wide Fund for Nature's Living Planet Index (LPI) of global biodiversity, as measured by populations of 1 686 vertebrate species across all regions of the world, showed that over the past 35 plus years, the earth's wildlife populations have declined by a third. The Report further states that humanity's demand on the planet's living resources (its Ecological Footprint) exceeded the planet's regenerative capacity by about 30% (World Wide Fund for Nature, 2008:1-2).

In the preface to her book "Environmental Science", Arms (1994: 5) concluded that we are not inevitably doomed by environmental problems. She felt that for every area suffering from massive deforestation, we can find another that has replanted its forests; for every country suffering the hardships of rapid population growth, we can find another that has restrained growth and revived its economy. Arms positive vision is that people can learn and change extraordinarily rapidly (Arms, 1994:5). However, these words were written in 1994 and stands in contradiction to the bleak picture painted in the 2008 World Wide Fund for Nature's Living Planet Report. We do not have any time to waste. The ecosystems are being run down and waste is accumulating in the air, on land and in water. The resulting deforestation, water shortages, declining biodiversity and climate change are placing the well-being and development of all nations at increasing risk. Around 50 countries are currently facing moderate or severe water stress and the number of people suffering from year-round or seasonal water shortages is expected to increase as a result of climate change. This has profound implications for the ecosystem health, food production and human well-being. Globally the prices of many crops have hit record highs, largely due to

surging demand for food, feed and bio-fuels, and, in some places, dwindling water supplies. At the same time the effects of global warming is becoming all the more evident (World Wide Fund for Nature, 2008: 1-2).

Education is considered to be the single most important step on our staircase to a better future. The solution to many of our environmental problems are well-known, but they are often not acted upon because people and politicians do not seem to recognize them, or have other priorities. By acknowledging our environmental problems, we can contribute to creating a sustainable world, a world where human populations can continue to exist indefinitely, maintaining a high standard of living and of health (Arms, 1994: 3). Many Environmental Educationists are of the opinion that Environmental Education has the capacity to cultivate environmentally-literate citizens who have learned to live and work in harmony with the environment (Bornman, 1997:58; Fien, 1993:19).

Litchfield and Foster (2009:7) indicate that, although the fundamental role of zoos is to act as powerful centres for *in situ* and *ex situ* conservation, they can also play a role in the human side of conservation due to the fact that they draw such a large number of visitors. In a recent study the researchers Falk, Reinhard, Vernon, Bronnenkant, Heimlich, and Deans (2010:4) concluded that zoos and aquariums do indeed make a difference in the conservation knowledge and in the attitudes of their visitors. Zoos are in a unique position to provide Environmental and Conservation Education (Patrick, Mathews, Ayers & Tunnicliffe, 2007:53; Tunnicliffe & Scheersol, 2009:19). Researchers found that people consistently point to the same kinds of life experiences, mainly in childhood, as profoundly having influenced their later interests in the environment. So, if we would like informed and environmentally-supportive citizens who care about wildlife, then connecting with nature is a priority. Visitors at the zoos are largely comprised of families with young children; thus zoos may be considered some of the best places where to watch this child-nature connection unfold (Lehnhardt, 2010:4).

Education in conservation, including all the different aspects, is considered one of the key functions of zoos (Patrick et al., 2007: 53). The development of Conservation Education programmes at zoos could help lead the way toward improving

programmes at other institutions that focus on conservation (Reading & Miller, 2007:89).

In this regard, Bettinger, Kuhar, Lehnhardt, Cox & Cress (2010:445) indicate that,

“Our ultimate conservation goal is to promote positive biological change, it is necessary to work on multiple fronts in an effort to address the variety of threats to wildlife and their habitats. If our ultimate goal is to change behaviour, our programmes must effectively communicate current conservation challenges so in the end we are all talking the same language”.

The research for this study will be done in three different countries, namely South Africa, Uganda and Malaysia. The study will take the form of a comparative evaluation of the Conservation Education programmes presented at these institutions, sharing their best practices in the three countries. The human species has a remarkable track record of ingenuity and problem-solving. The same spirit that took man to the moon must now be used to free the future generations from crippling ecological debt (World Wide Fund for Nature, 2008:1).

1.2 The research problem

Because zoos are in a remarkable position to contribute to Conservation Education, they constantly have to evaluate their Conservation Educational efforts and the conservation messages they convey (Balmford, Leader-Williams, Mace, Walter & Zimmerman, 2007:121; Gwynne, 2007: 51; Mazur & Clarke, 2001:185; Sterling, Wood & Lee, 2007: 38). Falk et al. (2010:5) indicate that although zoos and aquariums do promote the importance of inspiring conservation action, just yet very little has been done to assess the impact in this area. It is of the utmost importance that the Conservation Education programmes are constantly evaluated, but often do not receive sufficient attention. For education programmes to have a long-lasting effect, changes in knowledge, attitude, and behaviour have to take place. These aspects are all measurable, as long as the educators include evaluation as part of the programmes. It seems obvious that to become creditable in respect of education and

conservation, the zoo educators need to consistently evaluate and publish their work. Together with evaluation, the zoo educators will be able to move the field of wildlife education into the 21st century, to increase their credibility in both the conservation and education fields, and rest assured that their education efforts are making an impact on wildlife conservation (Lehnhardt, 2010:4).

1.3 The aim, objectives and the research questions

1.3.1 The aim

The aim of this study is to comparatively evaluate the Conservation Education programmes of the National Zoological Gardens of South Africa (NZG) in Pretoria, South Africa, the Uganda Wildlife Education Centre (UWEC) in Entebbe, Uganda and Zoo Negara in Kuala Lumpur in Malaysia, in order to devise a Model for an effective zoo Conservation Education Programme in order for them to fulfil their role as Conservation Educators.

1.3.2 The objectives

The objectives of the study are

- to evaluate the effectiveness of the Conservation Education programmes of the zoos in the three countries, as indicated above, in increasing the learners' knowledge, attitudes and values about wildlife and wild places;
- to benchmark the Conservation Education programmes of the NZG against those of the other two international zoos;
- to establish criteria for the successful implementation of Conservation Education programmes; and
- to determine whether it is the function of zoos to contribute to biodiversity conservation through Conservation Education.

1.3.3 The research questions

The quantitative questions in respect of this research study are the following, namely

- How effective are the Conservation Education programmes presented at the zoos in the three countries in increasing the learners' knowledge, attitudes and values about wildlife and wild places?
- How do the Conservation Education programmes of the NZG compare with those of the other two international zoos?

The qualitative research questions are, namely

- How does the Conservation Educational programmes of the NZG compare with those of the other two international zoos?
- What is the purpose of a zoo?
- Is there a justification for the existence of zoos?

1.4 Thesis statement

The implication of the study is to develop a Model for an effective Zoo Conservation Education Programme.

1.5 Research methodology

1.5.1 The mixed-methods approach

A mixed-methods approach will be followed in this research, namely by including both qualitative and quantitative methods. In mixed-methods research a strategy that employs more than one type of research method is adopted (Brannen, 2005:4; Johnson and Onwuegbuzie 2004:17; Symonds and Gorard, 2010:121). It also means working with different types of data (Brannen, 2005:4). In mixed-methods

research different methods may be combined *within* either the quantitative or the qualitative paradigm (Brannen, 2005:15). Johnson and Onwuegbuzie (2004:14) indicated that a key feature of mixed-methods research is its methodological diversity which frequently results in superior research, as compared to a single method research. Therefore, in order to meet the objectives of this study, quantitative and qualitative methods will be used. The findings obtained by means of quantitative and qualitative studies will be integrated to establish the criteria for an effective zoo Conservation Education programme.

1.5.2 The quantitative study

- The researcher will make use of brainstorming sessions to collect the preliminary data and to help with the development of the questionnaires.

The Conservation Education Programmes of the NZG, the UWEC and Zoo Negara will be evaluated by means of group-administered questionnaires. Lehnhardt (2010:4), the Curator of Education at Disney's Animal Kingdom, indicated that the objectives of the different programmes are to be used to identify specific evaluation questions that will demonstrate whether the objectives have been met.

- **The development of a cognitive measure**

Brainstorming sessions will be held with zoo educators to identify the key messages that the zoo and aquarium programmes strive to communicate to the learners attending the programmes.

- **The outcomes of the affective messages**

Additionally, brainstorming sessions will be held with the zoo educators to identify the key messages that zoo and aquarium programmes strive to communicate to the learners in respect of the affective messages, namely attitudes, values and behaviour.

- The standardisation of a measuring tool (questionnaires) according to the ages of the learners for the measurement of cognitive and affective messages will be done during the pilot study.

The following criteria will be used:

- The number of questions will be determined by the age group of the learners.
- The questions will be designed according to the cognitive level of the learners.
- The primary school learners will be asked “true or false” questions, as well as closed-ended questions, to establish their knowledge, attitudes and values in respect of conservation and the environment. This will be done before the actual programme commences, taking into consideration that many of the learners in this phase, especially those from the rural communities, have problems with writing skills. The questionnaires will be completed by them before and after of the programme in order to establish the success of the programme.
- In the case of the secondary school learners, the Likert-scale will be used to establish their knowledge, attitudes and values in connection with conservation and the environment before the commencement of the programme.
- The same questionnaires will be completed by the same learners before and after the programme to establish the success of the programme.
- Wherever necessary, the questions will be translated into the first language of the learners if it is not English, or if English is not the medium of instruction in their schools.

1.5.3 The qualitative study

The Conservation Education programmes of the NZG, the UWEC and Zoo Negara will be evaluated and the qualitative research questions will be addressed by means of semi-structured interviews. The researcher will work through a series of topics and the questions will be a combination of open ended and closed ended questions (McNeil & Chapman, 2005: 56).

The Kellogg Logic Model will be used to analyse the results of the evaluation study. A *Logic Model* is a systematic and visual way to present the relationships between the resources being used to operate the programme, the activities included in the programme, and the expected outcomes (W.K. Kellogg Foundation, 2004:1). It is a framework that can be put to good use as a tool to evaluate education programmes (McCawley 2002:1; Peter, 2013:12). The best practices and/or weaknesses in the Conservation Education programmes at the three zoos will be determined by means of this Model.

1.5.4 The pilot study

The questionnaires will be tested beforehand by means of a pilot test during which the questionnaire will be administered to a number participants who are similar to those who will form part of the actual research. Any problems in the wording of the draft questionnaire ought to show up at this stage, and can be corrected before the investigation starts (McNeill & Chapman, 2005:45).

Fifty primary school and fifty secondary school learners will complete the questionnaires at the UWEC during the pilot study. If necessary the questionnaires will be adapted and a follow-up test will be conducted.

1.5.5 The participants

For the quantitative study –

- The target groups will be primary and secondary school learners from a number of schools in Uganda, Malaysia and South Africa who attended the structured non-formal Conservation Education programmes at the zoos.
- The school year of the primary school learners is Grade 7 (the Senior Phase) in South Africa, the Higher Primary Level in Uganda, and Grade 7 (Primary Level 2) in Malaysia.

- The school year of the secondary school learners is Grade 10 (the Further Education and Training Phase) in South Africa, the Secondary Ordinary Level in Uganda, and Grade 10 in Malaysia.

For the qualitative study the participants will be –

- the Directors, Managers, and zoo educators at the National Zoological Gardens of South Africa, Zoo Negara (Malaysia) and the Uganda Wildlife Education Centre; and
- other key individuals in the zoo and conservation environment.

1.6 The significance of the study

Very little research has been done on the evaluation of Conservation Education programmes in zoos. Although a number of studies have been done in Africa, some of which will be discussed in Chapter 2 section 2.11, no study on the evaluation of Conservation Education programmes in a zoo in South Africa was found in the literature. The researcher hopes that this study will contribute to the body of knowledge on what makes Conservation Education in Africa successful in achieving its main aim, which is the conservation of our rich biodiversity.

1.7 The rationale for choosing the participating institutions

As mentioned above, the participating institutions are the National Zoological Gardens of South Africa, situated in Pretoria, South Africa, Zoo Negara in Kuala Lumpur, Malaysia, and the Uganda Wildlife Education Centre, situated in Entebbe, Uganda.

These institutions were included in the research for the following reasons:

- In South Africa and Malaysia the zoos are of international standard, and they have very similar objectives. Zoo Negara in Malaysia provides an excellent example to be used in a comparative study.

- It is important to include another African country in this study in order to achieve the objectives of this study, and therefore the UWEC was included.
- Although the UWEC has been established as a rehabilitation centre, it is also an educational centre for the wider community. The UWEC currently has on-going projects that enhance the conservation of threatened species. It carries out campaigns on environmental issues such as the endangered species and the 'bush meat' trade. The UWEC empowers the local communities to manage their natural resources sustainably and responsibly for long-term economic gain and environmental prosperity (Uganda Wildlife Education Centre, n.d.).
- Uganda, South Africa and Malaysia are all three countries with a rich biodiversity. The number of species in Malaysia is estimated at more than 170 000 (Ministry of Natural Resources, 2006:3). South Africa has one of the world's greatest diversity of plant and animal species contained within one country, and is home to many species found nowhere else in the world. "South Africa occupies only 2% of the world's land surface, yet contains a disproportionately large share of global biodiversity, being home to nearly 10% of the planet's plant species and 7% of the reptile, bird and mammal species" (Department of Environmental Affairs, 2012: 109). Uganda is exceptionally important in terms of biodiversity. Surveys indicate the existence of 18 783 species and the country has more species of primates than any other place on earth consisting of a similar area (U.S. Aid/Uganda, 2006:9). Additionally, these countries face similar threats to biodiversity, namely the destruction of the habitats, poaching, and the illegal trade in wild animals, among others (Ministry of Natural Resources, 2006:5; US Aid/Uganda, 2006:3; Department of Environmental Affairs, 2012:109-110).
- The researcher has previously established contact with the National Zoological Gardens, Zoo Negara and the UWEC.

Zoo Negara and the UWEC have been chosen as the research sites on grounds of convenience sampling.

1.8 Definitions of the terms and concepts

***In situ* conservation**

According to the Collins Dictionary of the English Language (2010:414), *in situ*, a Latin term, means 'in the original position'. *In situ conservation* is therefore the process of protecting the plant or animal species in its natural habitat.

***Ex situ* conservation**

Ex situ conservation is the process of protecting a plant or animal species outside its natural habitat, for example in a zoo.

Structured non-formal learning programmes

These are learning programmes offered at an institution outside the established school system where learning is assisted by a 'more knowledgeable other',, for example a zoo educator, who provides support and guidance throughout the learning process (Jensen, 2011:96-97).

Free-choice learning

Free choice learning is defined by Falk, Heimlich and Foutz (2009: 53) as learning that takes place in Environmental Education settings, where the learning is largely under the choice and control of the learners, and where they do not participate in structured programmes.

Zoo

According to the Collins Dictionary of the English Language (2010: 976), a zoo is "...a place where live animals are kept, studied, bred and exhibited to the public".

However, it is difficult to make absolute distinctions as to what constitutes a 'zoo' versus a 'public aquarium', as most will include terrestrial, aquatic, amphibious and highly water-dependent species in their collections, although usually in different taxonomic proportions (Penning, Reid, Koldewey, Dick, Andrews, Arai, Garratt, Gendron, Lange, Tanner, Tonge, Van den Sande, Warmolts, & Gibson, 2009:1).

For this reason, both zoos and aquariums, freshwater and seawater, are referred to as 'zoological institutions'. In this study, the term 'zoo' will include an 'aquarium'.

1.9 Overview of the chapters

Chapter 1 - Introduction

The introduction and background to the research were discussed in this chapter. Furthermore, the research problem, aim, objectives and research questions were stated. The research methodology that will be used was discussed, as well as the significance of the study and the rationale for choosing the participating institutions.

Chapter 2 - Zoos and their role in changing knowledge, skills, behaviour, values and attitudes

A review of the literature was done in order to:

- give an overview of the importance and threats to biodiversity;
- give an overview of the global environmental crisis;
- discuss Environmental Education, Conservation Education and Education for Sustainable Development by
 - looking at the history of Environmental Education and the development thereof in South Africa;
 - defining Environmental Education, and formalizing its objectives;
 - defining Conservation Education, and indicating its position in Environmental Education.
- determine the right of existence of zoos and aquaria in modern society by discussing
 - the history of zoos;
 - the roles of zoos in recreation, research, conservation and Conservation Education;
- determine zoos' role in changing knowledge, skills, behaviour, attitudes and values;

- establish the need for evaluating Conservation Education programmes in zoos;
- determine the influence of different social contexts with regard to the implication of Conservation Education programmes in different countries;
- report on case studies.

Chapter 3 - The research design

The research design will be outlined in this chapter, by discussing:

- the theoretical framework on which this research is based;
- the mixed-methods research design that will be used in this study;
- the methods that will be used to collect the data, the research instruments, sampling techniques, the data analyses, and validity and reliability for both the quantitative and qualitative sections of the study;
- the delineation and limitations of the study; as well as
- the ethical considerations.

Chapter 4 - The results of the study

The quantitative part of this study will be presented in Chapter 4, as follows, namely by

- a description and representation in figures and tables of the demographic profile of the respondents in the quantitative study;
- an illustration of the results of the quantitative study as well as the statistical significance of the results by means of tables and figures; and
- a discussion of the quantitative results.

The qualitative part of this study will be presented as follows, namely by:

- indicating who the participants are;
- presenting the results of the evaluation of the Conservation Education programmes of the different zoos by means of the Kellogg's Logic model; and
- addressing the different qualitative research questions.

Chapter 5 - Summary of the findings, conclusions and recommendations

The findings of this study will be summarised in section 5.2 in the form of a table, comparing the results of the quantitative and qualitative studies at the different zoos.

Thereafter conclusions will be made by addressing the quantitative and qualitative research questions. Recommendations will follow in order to establish a Model for effective Conservation Education Programmes in zoos, taking into consideration the findings of the literature review, the recommendations made by the participants of the qualitative study, the findings of the Logic Model evaluation study, as well as the findings of the quantitative study. To conclude this study, suggestions for further research will be made.

CHAPTER 2

ZOOS AND THEIR ROLE IN CHANGING KNOWLEDGE AND SKILLS, BEHAVIOUR, ATTITUDES AND VALUES

Up in this high air you breathed easily, drawing in a vital assurance and lightness of heart. In the highlands you woke up in the morning and thought: here I am where I ought to be.

- Karen von Blixen-Finecke: *Out of Africa*, 1937 -

2.1 Introduction

This chapter starts off by looking at *biodiversity* and its importance for human survival and sustainable development. The loss of biodiversity and the threats thereof are examined. The next section will deal with the global environmental crises we are facing, and the place of biodiversity within the global context. Thereafter the development of Environmental Education will be discussed, as well as the place of Conservation Education within the sphere of Education for Sustainable Development.

Zoos reveal both the best and the worst of human nature. The question whether zoos today still have a role to play is examined by looking at the evolution of zoos together with that of modern societies, and by examining the different functions of zoos to conserve wild animals and wild species.

Since environmental problems are the result of human behaviour, the roles of zoos in changing human behaviour through Conservation Educational programmes are discussed with regards to a change in knowledge, skills, attitude and behaviour. Different models of pro-environmental behaviour will, though, be discussed in the next chapter. The discourse then goes in the direction of the need for evaluating Conservation Education programmes. Since this study is done in different countries, the factors that have to be considered in the different social contexts will also be taken into consideration.

To close this chapter a number of case studies on the evaluation of Conservation Education programmes are discussed. Not included in this chapter, however, is a review of the literature on free-choice learning, since the specific measurements of the constructs relevant to the research aim is that of change in respect of knowledge, skills, attitudes and behaviour through structured non-formal Conservation Educational programmes, and not by means of free-choice learning.

2.2 The loss of biodiversity

The diversity of life is one of the greatest wonders on earth (De Beer, Dreyer & Loubser, 2005:3). People are fascinated by animals such as pandas and tapirs in zoos, and it is easy to get emotional by the thought of these lovely animals becoming extinct. However, very few people have the same compassion towards the tiny insects on the floor of the tropical forests or in deserts – all of which form part of our biodiversity. Shockingly, as mentioned before, almost one third of the global biodiversity has been lost over the past 35 years (World Wide Fund for Nature, 2008:2). This may have serious consequences for the future of the human population (Ash & Fazel, 2007:60; De Beer, et al., 2005:3; Rockström & Karlberg, 2010:257-258; World Wide Fund for Nature, 2008:4). Everything we eat, drink or produce is ultimately derived from biodiversity and, therefore, world economies are dependent on an intact, healthy and functioning biodiversity (Dickie, 2009:5).

2.2.1 Defining *biodiversity*

Biodiversity constitutes the variety of life on earth. The term stems from *biological diversity* (Ash & Fazel, 2007:60; Biggs, 2009:1).

In 1992 *biological diversity* was defined at the United Nations' Convention on Biological Diversity (CBD) as

“...the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems” (International Union for the Conservation of Nature, 1992:1).

A simpler definition is that by the International Union for the Conservation of Nature (1994:73), who defined it as “...the richness and vast variety of forms of life on earth”.

Biodiversity is often defined as the variety among living organisms, and the ecological communities they inhabit (De Beer et al., 2005:3).

It provides the basis for the ecosystems and the services they provide, and on which all human beings depend. It is composed of genetic diversity, the diversity of the species, the diversity of the ecosystem, and cultural diversity (Van Rooyen, 2009:10).

Species diversity refers to the variety and abundance of species within a geographic area (Biggs, 2009:1). *Ecosystem diversity* refers to the variety of ecosystems found within a certain political or geographical boundary, or to the variety of species within different ecosystems (Biggs, 2009:1). *Genetic diversity* refers to the variation of genes within species (Biggs, 2009:1), while *cultural diversity* refers to the variety of cultures found within a certain geographical boundary, and which includes human customs, traditions, beliefs, knowledge and languages, that create the framework of society (Van Rooyen, 2009:22).

Biodiversity includes more than simply a variation in appearance and composition, but also the following, namely

- abundance, such as the number of genes, individuals or habitats on a particular site;
- dispersal across sites and through time;
- behaviour, including interactions among the different components of biodiversity, such as those between predator and prey; and
- human cultural diversity, which can be affected by the same drivers as biodiversity, and which has an impact on the diversity of genes, other species and ecosystems (Ash & Fazel, 2007:60).

Biodiversity has evolved over the last approximate 3,8 billion years of the earth's 5 billion-year history into the large number of and the variety of genes, species and ecosystems in existence today. Human societies have developed together with these genes, species and ecosystems, and are dependent on them (Ash & Fazel, 2007:60). Ecosystem services are the benefits that people get from the ecosystems and the species that are part of these ecosystems.

Ecosystem services include:

- the provisioning of services - the goods obtained directly from ecosystems, e.g., food, medicines, timber, fibre and biofuel;
- regulating services - the benefits obtained from the regulation of natural processes, e.g., water filtration, waste decomposition, climate regulation, crop pollination, and the regulation of some diseases;
- supporting services - the regulation of basic ecological functions and processes that are necessary for the provision of all other ecosystem services, e.g., the cycling of nutrients, , photosynthesis and soil formation; and
- cultural services - the psychological and emotional benefits gained from human relations with ecosystems, e.g., enriching recreational, aesthetic and spiritual experiences (World Wide Fund for Nature, 2010:10).

These ecosystem services originate from living organisms. The abundance of a particular species is critical in maintaining the stability of the habitat and the provision of the mentioned services, rather than biodiversity as such. The decline of a critical species at a local scale will have a negative effect on the ecosystem services, even if that species is not threatened globally (World Wide Fund for Nature, 2008:4). The value of biodiversity for human well-being, while not easily measurable, could be the difference between a planet that can support its human population, and one which cannot (World Wide Fund for Nature, 2008:4).

2.2.2 Threats to biodiversity

There has long been a belief that the sea, at least, was inviolate, beyond man's ability to change and to despoil. But this belief, unfortunately, has proved to be naïve.

- Rachel Carson: *The Sea Around Us*, 1951 -

The World Wide Fund for Nature document, 'The Living Planet Report' indicates the state of the planet's ecosystems. According to this document, global

biodiversity, as measured by populations of 1 686 vertebrate species across all regions of the world, has declined by nearly 30% over the past 35 years. At the same time, the 'Ecological Footprint', which indicates the extent and type of human demand being placed on these systems, now exceeds the planet's regenerative capacity by about 30% (World Wide Fund for Nature, 2008:2). Hoffmann, Hilton-Taylor, Angulo, Böhm, Brooks, Butchart, Carpenter, *et al* (2010:1503) used data on 25 780 species categorized on the International Union for Conservation of Nature's (International Union for the Conservation of Nature) so-called 'red list', and concluded that one-fifth of vertebrate species is classified as threatened. They also found that this figure is increasing by 52 species of mammals, birds and amphibians, moving one category closer to extinction each year (Hoffman et al., 2010:1503).

Species become extinct when they disappear owing to changes in their living conditions which they are unable to survive (De Beer et al., 2005:3). Although five major extinction events have been recorded in the planet's history, humanity has entered a new phase of sustainability challenges, namely the *Anthropocene*, in which human development has reached a scale where it affects vital planetary processes (Ash & Fazel, 2007:162; Rockström & Karlberg, 2010:257-258). All available evidence points to a sixth major extinction event currently on our doorstep. The other five major extinction events were due to natural disasters and planetary change; however, the current loss of biodiversity is mainly due to human activities. Even though the extinction of species is a natural process, and would occur despite human actions, biodiversity loss in the Anthropocene has accelerated massively, and is currently projected to be 100 to 1000 times higher than what could be considered natural (Rockström, 2009:474). Human activities are the main causes of the acceleration, due to climate change, land-use changes, the introduction of alien species into terrestrial and freshwater environments, and the duration and magnitude of wild fires (Ash & Fazel, 2007:162; Rockström, 2009:474).

The direct, anthropogenic threats to biodiversity include the following:

- The loss, alteration, and fragmentation of the habitat, mainly through

- the conversion of land for agricultural, aquaculture, and industrial or urban use;
- damming, and other changes to the river systems for irrigation;
- hydropower, or flow regulation; and
- damaging fishing activities (World Wide Fund for Nature, 2008:4; World Wide Fund for Nature, 2010:10).

All plants and animals rely on their habitat for food, water, shelter, reproduction, and living space. Many countries, for instance, have lost considerable parts of their wetlands and forests, which are home to millions of species (De Beer et al., 2005:3).

- The over-exploitation of the populations of wild species, mainly through the harvesting of animals and plants for food, and materials or medicine, at a rate above the reproductive capacity of the population (World Wide Fund for Nature, 2008:4; World Wide Fund for Nature, 2010:10). Illegal trade is a serious problem, and frequently there is little control over it. It is often linked to trade in a particular species. Elephant tusks, rhinoceros horn, and tiger skins are examples (De Beer et al., 2005:6). Poaching and hunting is linked to illegal trade. The poaching of rhinoceroses in Southern Africa is posing a serious threat to the survival of these species, mainly to supply the market in rhinoceros horn in Vietnam (International Fund for Animal Welfare, 2013:10). Examples of other species that are exploited for illegal trade are turtles, parrots and monkeys. Some species are faced with extinction because they are regarded as vermin, for example the African wild dog. This species has been in conflict with stock farmers, and hunted to the brink of extinction. The disappearance of the bluebuck and the quagga is directly linked to being hunted in the past (De Beer et al., 2005:6).
- Pollution, mainly from the excessive use of pesticides and poison in agriculture and aquaculture; urban and industrial effluents; mining waste; and excessive fertilizer-use in agriculture (World Wide Fund for Nature, 2008:4; World Wide Fund for Nature, 2010:10).

An example of a species that has become at risk because of the above is the Cape Griffon vulture, which is classified as vulnerable on the International Union for the Conservation of Nature 'red-data list' (International Union for the Conservation of Nature, 2012). Poison bait, placed out by farmers in an attempt to control stock predators has killed many of these birds (De Beer et al., 2005:6).

- Climate change, due to rising levels of greenhouse gases in the atmosphere, caused mainly by the burning of fossil fuels, the clearing of forests, and industrial processes (World Wide Fund for Nature, 2008:4; World Wide Fund for Nature, 2010:10).

Climate change is potentially the greatest threat to biodiversity (World Wide Fund for Nature, 2008:4). Early impacts have been felt in polar marine ecosystems. These ecosystems are very sensitive to climate change, since a small rise in temperature changes the thickness and amount of sea ice on which many species depend (Ash & Fazel, 2007:169). Montane and coastal and marine ecosystems, such as coral reefs, also first showed the symptoms of climate change. Although future impacts are difficult to predict at local scale, any ecosystem may be vulnerable to changing temperatures or weather patterns (World Wide Fund for Nature, 2008:4). Climate change impacts on biodiversity in that the expansion or contraction of the ranges of species can occur. It can lead to the extinction of the species when they cannot adapt to the changing climate; it can also lead to changes in the compositions and interactions of the species (Ash & Fazel, 2007:169).

Climate change will probably become a more important driver of changes in biodiversity as the distributions and relative abundance of the species shift together with their preferred climate towards the poles and higher altitudes. Furthermore, changes in the range of vector species may facilitate the spreading of diseases, affecting humans and other species, for example, malaria, and the amphibian fungal disease, chytridiomycosis (Ash & Fazel, 2007:168).

- Invasive species introduced deliberately or inadvertently to one part of the world from another. They then become competitors, predators or parasites of the native species (World Wide Fund for Nature, 2008:4; World Wide Fund for Nature, 2010:10).

When an alien species is introduced to an area, it may have advantages which allow it to survive better than the indigenous species, and thus it may threaten these local species with extinction, for example many natural vegetation areas in South Africa is threatened by Australian acacias, such as Port Jackson and black wattle. Another example is some exotic fish species in rivers and dams taking over the habitat of the indigenous fish. Inter-breeding between alien animal species and indigenous species sometimes occurs, for example between the domestic cat and the African wild cat (De Beer et al., 2005:6).

The spreading of alien species and diseases around the globe is aggravated by the vast flow of goods and people around the world (World Wide Fund for Nature, 2008:4; Chapin, Kofinas & Folke, 2010:3).

The abovementioned five threats result from the demands human beings place on the biosphere to provide in the ever-increasing need to produce food and energy, and to dispose of the associated waste-products, as well as the displacement of the natural ecosystems by towns, cities, and infrastructure (World Wide Fund for Nature, 2008:4; Chapin et al., 2010:3).

Two important landmarks in the conservation of biodiversity are the existence of the Brundtland Report, 'Our Common Future', and 'The Convention on Biological Diversity' (CBD).

The World Commission on Environment and Development, also referred to as the Brundtland Commission, defined *sustainable development* as follows, "Sustainable development is development that meets the needs of the present without

compromising the ability of future generations to meet their own needs" (United Nations, 1987:43).

Reducing the rate of the loss of biodiversity and ensuring that the decisions that are made incorporate the values of goods-and-services provided by biodiversity, will contribute substantially towards achieving sustainable development, as described in this Report (Ash & Fazel, 2007:158).

Another important intervention in the conservation of biodiversity is the CBD which was signed at the Rio Summit in 1992 and which came into effect at the end of 1993. This is one of the most significant and far-reaching environmental treaties ever to have been developed (Heywood, 1995:xi). The CBD is an all-inclusive binding treaty, covering the use and conservation of biodiversity which requires countries to develop and implement strategies for its sustainable use and conservation, and also provides a platform for continuing the international discourse on biodiversity-related matters through the Annual Conference of the Parties (COP) (United Nations Environment Programme, n.d.). Furthermore, the CBD includes education and capacity-building, aimed at responding to a wide range of environmental issues (Irwin & Lotz-Sisitka, 2005:42).

If the Anthropogenic mass extinction of species is allowed to continue, a crisis with a far more lasting impact than any other environmental problem will result. According to evidence from previous mass extinctions in the prehistoric past, evolutionary processes do not produce replacement species within less than several million years (Myers, Mittermeier, Da Fonseca & Kent, 2000:858). The earth cannot sustain the current loss of biodiversity without significantly reducing ecosystem resilience (Rockström, 2009:474). Our actions within the next few decades will determine the long-term future of the abundance and diversity of the species of the biosphere (Myers et al., 2000:858). Conservation and the sustainable use of biological diversity are of critical importance for meeting the food, health and other needs of the growing world population (International Union for the Conservation of Nature, 1992:2).

"Every species has the right to exist. Our challenge as custodians of the planet is to ensure their survival," according to De Beer et al. (2005:3).

2.3 The global environmental crisis

During the Holocene, a geological epoch that lasted for the past 10 000 years, environmental change has occurred naturally, and the earth's regulatory capacity has maintained the conditions that enabled human development. Temperatures, the availability of fresh water and biogeochemical flows have stayed within a desirable range. However, human activities have now reached a level that could damage the systems that keep the earth in the desirable Holocene state, mainly due to a rapidly growing dependence on fossil fuels and industrialized forms of agriculture (Rockström, 2009:472).

According to Rockström and Karlberg (2010:265), human development can no longer be separated from the climate system and the global fresh water and nutrient cycles. The abovementioned researchers are of the opinion that an integrated social-ecological approach to human development is needed, which integrates the importance of resilience and the capacity of the mentioned systems to remain in a desired state for humans. They subsequently conceptualised this social-ecological challenge as a 'quadruple squeeze' on humanity's ability to secure long-term sustainable development on planet Earth.

The first 'squeeze' includes demographic growth requirements (Rockström & Karlberg, 2010:258). The world population reached 7.06 billion in mid-2012 (Population Reference Bureau, 2013). Moreover, the pressure on the planet from the *demographic squeeze* is characterized by a 20/80 dilemma: the old industrialized and rich countries represent only a 20% minority on the planet, but are responsible for most of the acceleration of environmental pressures, while the 80% poor majority are the most vulnerable to the impact of global environmental degradation (Rockström & Karlberg, 2010:258). With the increase in the human population comes an increased demand for food and natural resources. This has led to an increase in agriculture, forestry and other human activities which, in turn, has led to a significant land-cover change, and the loss of biodiversity (Chapin et al., 2010:3; World Wide Fund for Nature, 2008:4).

The second 'squeeze' consists of the global anthropogenic climate crises (Rockström & Karlberg, 2010:258). According to the 2008 Living Planet Report (World Wide Fund

for Nature, 2008:4), climate change will be the greatest threat to biodiversity in the decades to come. Early impacts have been felt in the polar and montane, as well as in the coastal and marine ecosystems, such as coral reefs, and although future impacts will be difficult to predict at local scales, any ecosystem may be susceptible to changing temperatures or weather patterns (World Wide Fund for Nature, 2008:4).

The third 'squeeze' is the global ecosystem crisis (Rockström & Karlberg, 2010:259). Humans depend on healthy ecosystems to support or improve the quality of life. Without ecosystems the earth would be uninhabitable (World Wide Fund for Nature, 2008:4). The capacity of the functions and services of the ecosystem to contribute to the future wellbeing and resilience of humanity has in the past 50 years been decreased by 60%. This also includes the functions of the two main ecosystems, namely to function as carbon sinks, and to regulate the flow of water in the landscapes (Rockström & Karlberg, 2010:259).

The fourth planetary 'squeeze' is the universality of surprise in ecosystem change. Although the ecosystems sometimes respond uneventfully to changing pressures, this is often the exception rather than the rule. Many sub-systems react in a non-linear, often abrupt way. The surprising and non-linear way that ecosystems mostly react to changing pressures generates the dilemma that 99% of the change in the ecosystems occurs from 1% of events, such as major shifts in forests after fires or marine systems after storms. These changes are often abrupt and irreversible (Rockström & Karlberg, 2010:259). The stewardship of ecosystems that adapt to surprise requires a surplus and buffering capacity in order to build resilience to shocks and disturbance. This in turn, reduces the operating space for human development (Chaplin, 2010:29).

Social-ecological challenges call for a new 'green' revolution which, moreover, will have to occur mostly in the world's most social-ecological vulnerable regions (Rockström & Karlberg, 2010:258). At the same time, the loss of biodiversity particularly affects the poor, who are the most directly dependent on ecosystem services at the local scale, and are unable to pay for alternatives (Ash & Fazel, 2007:60). Besides the value of biodiversity for the supply of essential ecosystem services, it also has an inherent value independent from its functions and other benefits to people. At present we are facing the challenge of balancing the cultural,

economic, social and environmental values of biodiversity so that it may be conserved and used in a manner that will allow it to be available for, and to sustain the generations of the future (Ash & Fazel, 2007:160).

2.4. Environmental Education, Conservation Education and Education for Sustainable Development

Teach your scholar to observe the phenomena of nature; you will soon rouse his curiosity, but if you would have it grow, do not be in too great a hurry to satisfy this curiosity. Put the problems before him and let him solve them himself.

Let him know nothing because you have told him, but because he has learnt it for himself. Let him not be taught science, let him discover it.

If ever you substitute authority for reason he will cease to reason; he will be a mere plaything of other people's thoughts.

- Jean-Jacques Rousseau: *Emile*, 1762 -

2.4.1 The history of Environmental Education, and its development in South Africa

One of the earliest roots of Environmental Education can be found in Jean-Jacques Rousseau's *Emile* that was first published in 1762. *Emile* is a book on educational philosophy written in the form of a novel. Rousseau maintains that education should include a focus on the environment, and he argues that one of the main things a teacher has to do is to facilitate opportunities for the student to learn (McCrea, 2005:12). However, Environmental Education goes back even further. In Ancient Egypt the Pharaoh, Ikhnaton, sent his workers to educate the farmers along the Nile to protect the river; while in China public education programmes to encourage reforestation were run about 3 000 years ago. The first person to recognize the basic principles of ecology was Theophrastus, a student of Aristotle in the 4th century BC. ,in Greece. Theophrastus pleaded for a form of integrated management of the environment that included public education (Irwin & Lotz-Sisitka, 2005:35).

Our current understanding of Environmental Education has its roots in the 19th century, when the Industrial Revolution led to issues such as mass-production, poor health conditions, social problems, such as child labour and alcohol abuse, and environmental destruction (Irwin & Lotz-Sisitka, 2005:38). Louis Agassiz, born in 1807, became a renowned scientist who wrote articles in the popular press. He urged his students to learn directly from nature. In 1891 Wilbur Jackman wrote the book *Nature Study for the Common School*, which defined the nature study movement (McCrea, 2005:2). The main figure of the 19th century, in terms of the methodology of Environmental Education, was Patrick Geddes (1854-1933), a Scottish professor of Botany. He dedicated himself to the improvement of both education and the environment, and is regarded as the founder of our present-day understanding of Environmental Education (Irwin & Lotz-Sisitka, 2005:38).

Liberty Hyde Bailey, a noted botanist, writer, college administrator, educator and proponent of nature study rejected the use of the term *Environmental Education* in 1905, because he thought it was not accurate but pretentious, and would always need to be explained. Even so, the term was first used officially in 1948 by Thomas Pritchard, Deputy Director of the Nature Conservancy in Wales, at a meeting of the International Union for the Conservation of Nature (McCrea, 2005:2-3).

In the 1930's a Conservation Education movement, led by John Dewey, was developed in response to wind erosion and other resource problems in America's heartland. This progressive education movement promoted a more student-centred and holistic approach to education. The movement included many aspects of Environmental Education that are still valid today, such as learning by doing, lifelong learning, and integrated and interdisciplinary approaches. In the 1950s The Conservation Education Association and the Association of Interpretative Naturalists were formed (McCrea, 2005:3). At the same time, in South Africa, an African church leader offered community education programmes in order to slow down soil erosion in the Transkei region (Rosenberg, 2009:8).

The landmark publication of Rachel Carson's 'Silent Spring' in 1967 sounded the alarm on the harmful effects of chemicals on wildlife (Carson, 1967). This book is an example of the need for public knowledge and awareness about the environment and

environmental issues that emerged in the years after the Second World War. The International Union for the Conservation of Nature was also formed during this time, and later also the World Wide Fund for Nature in 1961, primarily to raise funds for wildlife education (Irwin & Lotz-Sisitka, 2005:39).

In 1984 the Environmental Education Association of Southern Africa (EEASA) was formed. This Body played an important role in the networking between environmental educators, and in growing the field of Environmental Education. EEASA adopted the goals and guiding principles that were formulated in 1977 by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in Tbilisi. During the 1970s and 1980s the focus was on the need to protect Africa's dwindling wildlife and wildernesses by means of Conservation Education. Eventually educators became more aware of the need to further investigate the interaction between the ecological, social, economic and cultural aspects of the environment, the need to protect the environment as the basis for human well-being and sustainable livelihoods, the complex relations between social and economic development, and the improvement of the environment (Rosenberg, 2009:8).

The 1992 United Nations Conference on Environmental and Development (UNCED), also known as the Earth Summit, focused on the role of Environmental Education as an educational response to the environmental crisis, while the 1992 CBD included education and capacity-building aimed at countering environmental issues (Irwin & Lotz-Sisitka, 2005:42). The Earth Summit produced principles for education for just and environmentally sustainable societies. UNCED also produced Agenda 21, which included guidelines for sustainable development that emphasised the need for education and public participation (Irwin & Lotz-Sisitka, 2005:42-43; Rosenberg, 2009:8).

The early 1990's was a time of many changes on the political front in South Africa. New environmental and educational policies were formulated. The new Constitution secured a healthy environment for all, and the 1995 White Paper on Education and Training stated that Environmental Education was necessary for all sectors and levels of society. Curriculum 2005 that was launched in 1995 included the environment as one of six phase organisers. The environment also featured in the revised National

Curriculum Statement for Grades R-9 across all learning areas and grades, both as one of the principles of a healthy environment, and as a specific learning outcome and content.

The 2002 Johannesburg World Summit on Sustainable Development emphasised the importance of sustainable development. The UN convened a Decade of Education for Sustainable Development at this Summit, emphasising the key role education has to play in the protection and the social development of the environment (Rosenberg, 2009:8-9). Currently, Environmental Educators in South Africa and in the Southern African Development Community (SADC) region are defining a clearer African focus on Environmental Education (Irwin & Lotz-Sisitka, 2005:54).

2.4.2 Defining *Environmental Education*, and formalizing its objectives

Do not try to satisfy your vanity by teaching a great many things. Awaken people's curiosity. It is enough to open minds; do not overload them. Put there just a spark. If there is some good inflammable stuff, it will catch fire.

- Tilden: *Interpreting our Heritage*, 1967 -

Stapp (1969:34) developed a well thought-out definition of Environmental Education in 1969. His definition is still consistent with many definitions found in the literature today.

He defined Environmental Education as follows:

“Environmental Education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution”..

Stapp (1969:34-35) stated that the principal feature of the philosophy of Environmental Education is that man is an integral part of a system from which he cannot be separated. Specifically, this system consists of three components, namely man, culture, and the biophysical environment. The fundamental relationship between

the integral parts of the system is man's interaction, through culture, with the biophysical environment in order to produce or obtain the goods and services that he needs. Stapp (1969:35) further stated that within this system man has the ability either to strengthen, to weaken, or to maintain the interrelationships between the system's major components. The ultimate goal of Environmental Education is the development and maintenance of a system of high quality in which man interacts, through cultures, on the biophysical environment in order to advance human welfare. Furthermore, people need to understand how to work towards solutions for biophysical environmental problems, and to realize that the responsibility for the solutions to these problems depends on them and their governments.

Two international definitions of Environmental Education adopted six years after the one by Stapp, are the 1975 Belgrade 'Working Definition of Environmental Education', and the 1977 Tbilisi Conference on Environmental Education's 'Concept of Environmental Education', which stated, as indicated below.

- Working Definition of Environmental Education, Belgrade, 1975

"Environmental Education should be an integral part of the educational process, aimed at practical problems of an interdisciplinary character, build a sense of values, and contribute to public well-being. Its focus should reside mainly in the initiative of the learners and their involvement in action and guided by both the immediate and future objects of concern" (Stapp, 1997).

- Concept of Environmental Education, Tibilisi, 1977

"Environmental Education is a process aimed at developing a world population that is aware of and concerned about the total environment and its associated problems, and has the attitudes, motivation, knowledge, commitment and skills to work individually and collectively towards solutions of current problems and the prevention of new ones" (Stapp, 1997).

The objectives for Environmental Education, as defined by the 1977 Tbilisi Inter-governmental Conference on Environmental Education are as follows:

- Awareness - to help social groups and individuals acquire an awareness of and sensitivity for the total environment and its allied problems (and/or issues).
- Sensitivity - to help social groups and individuals gain a variety of experiences in and acquire a basic understanding of the environment and its associated problems (and/or issues).
- Attitudes - to help social groups and individuals acquire a set of values and feelings of concern for the environment, and motivation for actively participating in the improvement and protection of the environment.
- Skills - to help social groups and individuals acquire skills for identifying and solving environmental problems (and/or issues).
- Participation - to provide social groups and individuals with the opportunity to be actively involved in working towards the resolution of environmental problems and/or issues at all levels (United Nations Educational, Scientific and Cultural Organization, 1977:26).

The Tbilisi guiding principles for Environmental Education stipulate that it should

- consider the environment in its totality – natural and built, technological and social (economic, political, technological, cultural-historical, moral, aesthetic);
- be a continuous lifelong process, beginning at pre-school level and continuing through all formal and non-formal stages;
- be inter-disciplinary in its approach, drawing on the specific content of each discipline in making a holistic and balanced perspective possible;
- examine major environmental issues from a local, national, regional and international point of view so that the learners may receive insight into environmental conditions in other geographical areas;
- focus on current and potential environmental situations, while taking the historical perspective into account;

- promote the values and necessity of local, national and international co-operation in the prevention and solution of environmental problems;
- explicitly consider environmental aspects in plans for development and growth;
- enable learners to play a role in planning their learning experiences, and to provide an opportunity for making decisions and accepting their consequences;
- relate environmental sensitivity, knowledge, problem-solving skills and the clarification of values to every age, but with special emphasis on environmental sensitivity to the learner's own community in the early years;
- help the learners to discover the symptoms and the real causes of environmental problems;
- emphasize the complexity of environmental problems and thus the need to develop critical thinking and problem-solving skills;
- utilize diverse learning environments and a broad array of educational approaches to teaching-learning about and from the environment, with due stress on practical activities and first-hand experiences (United Nations Educational, Scientific and Cultural Organization, 1977:26 -27).

The abovementioned Tbilisi definition, objectives and principles are often quoted within the behaviourist paradigm (Schulze, 2005:63). However, the educational task implied by these objectives in order to achieve the described citizenship behaviour goes beyond basic education in its traditional sense. They include not only knowledge, attitudes and skills, but also a focus on responsible behaviour (Hungerford & Volk, 1990:258).

The International Union for the Conservation of Nature (1971, in Irwin & Lotz-Sisitka, 2005:36) defines *Environmental Education* within the behaviourist paradigm as follows:

“Environmental Education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture and his biophysical surroundings.

Environmental Education also entails practice in decision-making and self-formulation of a code of behaviour about issues concerning environmental quality”.

This definition proved to be the most resilient one, and its strength lay in the fact that it includes many of the concepts that were regarded as essential at that time, for example

- the interrelatedness of people, their culture and their biophysical surroundings;
- the fact that people hold values and attitudes which, *inter alia*, relate to the environment and to behaviour towards the environment;
- that skills, including decision-making and the formulation of ethical standards, are an integral aspect of Environmental Education (Irwin & Lotz-Sisitka, 2005:36).

The criticism against this definition is that it has a rational, linear, developmental view of education, and lacks the social critique and social change whereby learners are encouraged to probe the social systems that are associated with environmental problems (Irwin & Lotz-Sisitka, 2005:37).

A further criticism against the behaviouristic nature of this definition came from Wigley (2000:5), namely “...the idea of being able to influence others’ behaviour is flawed”, as well as from Wals and Van der Leij (1997:51), stating that,

“We argue that behaviourism takes on a positivistic instrumental view of behaviour. In our view, knowledge and human interests are interwoven as reflected in the choice of methods and the ends to which such methods are put. The idea that there is a world that can be totally analysed, predicted, and controlled - the world of positivistic science, and, indeed, behaviourism - we find frightening”.

Later definitions of Environmental Education had a profounder, more critical view of the human-environment relationship than is most evident in the trend towards

conceptualizing “education for sustainability”, following the Rio Earth Summit in 1992, and the Brundtland Report in 1987 (Irwin & Lotz-Sisitka, 2005:36).

The term *sustainable development* was first accepted by the World Conservation Strategy in 1980, and was later reinforced in the Brundtland Report (Fien & Tilbury, 2002:14).

The Brundtland Commission defined *sustainable development* as follows,

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (United Nations, 1987:43).

Fien and Tilbury (2002:14) criticized this definition as being highly ambiguous. In addition, Jickling (1994:60) argued that we should not educate for sustainable development since it is “...contrary to the spirit of education”. Instead, education should be about creating possibilities which can arise when we “...embrace exploration, evaluation, and critique of emerging ideas since sustainability is a steppingstone for future visions” (Jickling, 1994:62). Further criticism against this definition is that sustainability should, like any concept, be open for informed debate, and should not be taught as a goal or an ideology, but as a way of continually asking better questions (SADC-ELMS, 1999:6).

Education for Sustainability or Education for Sustainable Development (ESD) can be defined as a lifelong learning process that leads to an informed and involved citizenry, having creative problem-solving skills, scientific and social literacy, and commitment to engage in responsible individual and co-operative actions (Cross 1998:43; Fien 1993:17).

ESD is often used interchangeably with Environmental Education (SADC-ELMS, 1999:6; Rosenberg, 2009:9; Taylor, 2012). However, it is also used as an ‘umbrella term’ and complements a number of other fields, such as Conservation Education, outdoor education, global change education, and others. However, ESD is considerably broader and embraces many aspects of these fields of study (Cross, 1998:43).

2.4.3 Defining *Conservation Education*, and finding its place in Environmental Education

The International Zoo Educators' Association (IZE) defines *Conservation Education* as the process of influencing people's attitudes, emotions, knowledge, and behaviours about wildlife and wild places. This is done through the efforts of skilled educators and interpreters, who use a variety of techniques, methods, and assessments to reconnect people with the natural world (International Zoo Educators' Association, 2013).

Jensen's (2013) perception of the distinction between Conservation Education and Environmental Education lies in the fact that Conservation Education more clearly emphasizes the normative dimension of trying to achieve change, whereas Environmental Education connotes a more value-neutral descriptive perspective that might not explicitly try to persuade people to behave differently.

Hiromi (2009:1950) defined *Conservation Education* as follows,

“Conservation Education is an important component of Environmental Education with the goal to teach the theory and practice of preservation and restoration of biodiversity affected by human activities so that people can increase their awareness of conservation issues and change their attitudes and behaviour to promote environmental conservation”.

According to Taylor (2012), Conservation Education is more about 'green' issues, whereas Environmental Education usually includes economic and 'brown' issues, like water, waste, and energy. Furthermore, elements of Conservation Education can be found in all countries and have a valid role to play while conscious efforts are being made to provide education which facilitates the wise management of natural resources, empowers people to participate in decisions that affect their daily lives, and contributes to the quest for sustainable development (SADC-ELMS, 1999:4). In addition, biodiversity is commonly accepted as one of the principles of ecological sustainability, since it is a very important factor in maintaining the capacity of natural

systems to sustain life and the sustainability of the earth as a living system (Schreuder, Reddy & La Grange, 2002:137). For that reason Conservation Education forms part of the bigger picture – that of Education for Sustainability. Environmental Education programmes and approaches in South Africa are very closely aligned with Education for Sustainable Development, and emphasise the need for environmental care and protection. Likewise, the term *Conservation Education* is used in the context of the role of biodiversity in economic development and livelihoods (Rosenberg, 2009:9).

For the purpose of this study the researcher will use the term *Conservation Education* as a component of Environmental Education when referring to the formal, non-formal and informal education programmes conducted at zoological institutions, including zoos and aquariums.

2.5 The history of zoos and their place in modern society

According to the Collins Dictionary of the English Language (2010:976), a zoo is “...a place where live animals are kept, studied, bred and exhibited to the public”. However, there are more to zoos than is captured in this definition. According to The World Association of Zoos and Aquariums, zoos and aquariums have a powerful role to play in achieving global sustainability (World Association of Zoos and Aquariums, 2005a:7). Nowadays conservation is part of how we live, and no longer something that happens in distant places and rural areas. All individuals need to take the responsibility for their influence on the world around them (Dickie, 2009:1). Zoos have the capacity to help us refocus our views of wild animals and wild places, since they can promote a new understanding of nature, and help to engender positive values and attitudes toward it (Dickie, 2009:4; Hancock, 2001:xi; Reading & Miller, 2007:63).

Although zoos have an important role to play environmentally, socially and economically (Dickie, 2009:5), their existence remains controversial. Zoo animals are often regarded as ambassadors for animals in the wild, namely as being sheltered and respected. However, some people regard zoo animals as captives,

subdued for man's pleasure (Hancocks, 2001:6). One extreme position is that zoos play such an important role in conservation that their existence is crucial for the survival of the species. While, on the other hand, some people think it is cruel to keep animals in captivity, and they want to see all zoos closed (Hancocks, 2001:6).

Some zoos have the financial means to display animals in enclosures that represent their natural habitat, and they also play an important role in conservation. But the lack of money is often seen as the reason for the poor conditions the animals are kept in, mainly in the developing world (Borchert, 2010:2). Hancocks (2001:xx) indicates that it may be that some zoos are not financially capable of rising above their poor standards. There are, however, zoos that seek only profit, and exploit the animals to that means.

Hancocks (2001:6) is of the opinion that for almost their entire history, zoos have been little more than collections of wild animals put on display to satisfy the dull gaze of the idly curious. Zoos reveal both the best and the worst of human nature. He says, "The desire for close contact with wild animals is counterbalanced by the lure for ownership of things that intrigue. The wish to protect rare things is offset by a need for control" (Hancocks, 2001:6).

It is enlightening to delve into the histories of zoos in order to contemplate on the question whether zoos have a place in modern society, and to understand why people have the need to keep the wild species near them in enclosed spaces, and why these places are so attractive to the curious (Baratay & Hardouin-Fugier, 2002:9; Hancocks, 2001:xvii; Jackson, 2010:38).

The above will be exploited in the next section.

2.5.1 The early beginnings of zoos

Exotic animals have long been sought-after collectibles. They are more fascinating and exciting than natural museum specimens, plants, or cultural artefacts; and more people visit zoos than museums, or engage in sports activities (Baratay & Hardouin-Fugier, 2002:9; Kisling, 2001:1;). Since ancient times the passion for possessing wild

animals from distant lands has overcome the great difficulties and expense of capturing, transporting, and maintaining them (Kisling, 2001:1).

The collecting of wild animals began about 3 000 B.C., together with the earliest urbanized civilization. Although these collections were not called “zoos”, they were, in effect, the first zoos. Zoo-related terminology, as it exists today, only came into use during the eighteenth and nineteenth centuries, when the modern concept of a zoo developed. During this period animal collections changed significantly, and became the cultural institutions that are now familiar to us (Kisling, 2001:1). Zoos have changed over centuries, since cultural institutions, like the cultures that foster them, evolved over time (Baratay & Hardouin-Fugier, 2002: 9-10; Kisling, 2001:1).

Ancient collections of animals began as more than merely gatherings, since the animals were kept within their natural settings. The early trade in exotic products also included both animals and plants, and rarely-seen species were popular acquisitions for the rich. While gardens existed throughout the different social classes, collections of living animals were, for most of their history, restricted to the wealthy and royalties (Kisling, 2001:2).

The gathering of animals for collections became more common as time went by. Ancient animal collections developed initially for two reasons, namely the keeping of wild animals for useful purposes, and then also because early societies evolved into civilizations that favoured collecting things (Kisling, 2001:2; Baratay & Hardouin-Fugier, 2002:13). The relationship between people and wild animals, and nature in general, developed simultaneously with that of the knowledge of the environment, as it became a necessity (Kisling, 2001:2).

2.5.2 The evolution of societies into civilizations with attributes favourable to collecting animals

Between 3 000 B.C and 15 000 B.C multi-faceted farming civilizations evolved into developed and educated civilizations with a more advanced social order, public government, and foreign trade. As foreign trade increased, people were exposed to new exotic countries and their wildlife. It became fashionable for the rich to have animal parks for their enjoyment, and collecting animals became a sign of power and

distinction (Kisling, 2001:7-8). Thus, for the greater part of their history, private zoos have been mainly symbols of prestige (Hancocks, 2001:6-7).

The earliest civilizations first arose in Mesopotamia along the Tigris and Euphrates of Western Asia, in what is now Iraq, in Egypt along the Nile River in North-eastern Africa, in India along the Indus River, in what is now Pakistan, and in China along the Yellow River. Although there were other, less complex societies throughout Europe, Asia and Africa, they did not develop the social structures that were favourable to collecting items of worth. Animal collections in Mesopotamia and Egypt became less prominent but nevertheless continued, while those in India disappeared when the Indus society re-emerged with India's Indo-Aryan societies. The habit of collecting wild animals in China and the Americas developed in isolation, and more modern collections appeared in Greece, Rome, Persia, the Arab regions, and eventually, in Medieval Europe (Kisling, 2001:8; Hancocks, 2001: 6-8).

2.5.3 Ancient collections and menageries

The first zoo appeared about forty-three hundred years ago, in the Sumerian city of Ur. Wealthy Egyptian kings maintained collections that grew to thousands of wild animals, including monkeys, wild cats, antelopes, hyenas, gazelles, ibex, and oryx. Animals were given as a sign of respect by neighbouring countries, and therefore these collections were the source of much pride (Hancocks, 2001:7).

Around 1400 B.C. Tuthmosis III assembled an assortment of exotic wild animals in the gardens of the temple at Karnak as a symbol of his imperial status. His stepmother, Queen Hatshepsut, financed expeditions to collect wild animals for her royal collection. She sent a ship to Somalia, bringing back monkeys, cheetahs, leopards, many kinds of birds, and even a giraffe, to add splendour to the gardens of her private palace. Tuthmosis IV (1425-1408 B.C.) was accompanied by two lions during his hunting expeditions. Rameses II (1298-1235 B.C.) had several giraffes and lions in his zoo. He even had a lion that accompanied him to the battlefields, that guarded his tent at night (Kisling, 2001:14; Hancocks, 2001:7). Rameses IX sent gifts of monkeys, crocodiles, and a hippopotamus to Tiglath-Pileser I, king of Assyria. A large pond was built for the hippopotamus at this royal zoo; several species of large cats were kept in pits (Hancocks, 2001:7). Although animal

husbandry practices in Egypt were primarily concerned with cattle, the Egyptians extended it to their wild animal species (Kisling, 2001:13).

The ancient Egyptians regarded specific animals as incarnations of the gods. Baboons and monkeys were favoured to be kept in the temples. Ibis, falcons, and crocodiles were mummified by the hundreds of thousands during ceremonial sacrifices. This led to the extinction of these species in many parts of Egypt (Hancocks, 2001:8).

European explorers and merchants reaching Asia found that royal animal collections existed throughout the region. The attitudes of the ancient Chinese toward wild animals and nature ranged from ethical concern to uncaring use, but mostly they regarded animals as being fearful. These attitudes subsided over time, but never disappeared completely. Intellectual interest in nature was negligible, except for its use for medicinal purposes. Nevertheless, wild animals, especially exotic species, held the interest of rulers and the wealthy classes, as they did in other ancient societies. Wen-Wang, founder of the Zhou dynasty, built the first reserve, the Garden of Intelligence, some three thousand years ago (Kisling, 2001:16; Hancocks, 2001:8). This reserve and similar royal and baronial parks of the Zhou period were large, walled-in natural areas. The collections in these parks were used for the provision of food, and for religious ceremonies, hunting, and entertainment. The entertainment involved combat events between animals, as well as between men and animals, which involved unarmed men fighting against animals like lions, leopards, bears, yaks, elephants and rhinoceroses. The Chinese collections of the Yuan and Ming dynasties of 1200-1600 were made famous through the travels of Marco Polo and the trading expeditions of Zheng He (Kisling, 2001:16-17). As kingdoms became established across Asia, the libraries, museums, botanical gardens and zoos in court palaces served as sources of knowledge (Hancocks, 2001:8).

The Roman Emperors kept animal collections which displayed the Roman Republic's splendour, and these grew as Roman imperialism spread throughout Europe, Africa and Asia. There was a state-owned *vivarium* at Laurentum outside Rome, where an imperial elephant herd was kept during the first and second centuries A.D. *Vivarium* and *aviarium* are two of many Latin terms that have given rise to modern zoo

terminology. The collapse of the Roman infrastructure led to the loss of the Roman animal collections. However, the European collections continued throughout the Medieval period, to emerge as the menageries of the Renaissance period (Kisling, 2001:19-21).

During the Renaissance Europe evolved into a continent of nation-states with increased power, wealth, and influence. The small and scattered collections of wild animals from the Medieval period began to increase in size and numbers, and became known as *menageries* (Kisling, 2001:33). Europe's growth and power had an impact beyond its borders, as it explored and settled in other regions of the world. Animals from these newly-settled regions were of commercial value, and they also held Europe's interest for scientific reasons. Animals were regular cargo at European and colonial ports by the seventeenth century. As the Portuguese, Spanish, Dutch, British, French and German empires expanded, they established botanical collecting stations in their colonies which were often also used to keep animals. Some of these holding facilities developed into colonial menageries and eventually into national zoological parks, following the independence of the colonies (Kisling, 2001:33).

2.5.4 Zoos in recent times

To tour the cages of the zoo is to understand the society that erected them.

- Baratay and Hardouin-Fugier (2002:13) -

Modern zoos, as we know them, really took off in the eighteenth and nineteenth centuries, when animal displays were opened to all, and public education and support for scientific endeavour became founding principles (Jackson, 2010:39). A shift from royal and private menageries to public menageries occurred between the late 1700s and early 1800s (Kisling, 2001:134).

Carl Hagenbeck developed the first open zoo, the Tierpark Hagenbeck in Hamburg. He was not a traditional zoo director; he designed a totally new concept of a zoo in 1908. New developments took place in the 1960's, and like Hagenbeck's *tierpark*, can also be considered to be paradigm shifts. These included the first marine park,

Marine Land in Florida, and Marine World of the Pacific, followed by the first drive-through lion safari park at Longleat, U.K. (Harrison, 2005:6).

Zoos today still continue to evolve from menageries through zoological parks to conservation resource centres (Hatchwell, Rübél, Dickie, West & Zimmerman, 2007:343; Kisling, 2001:41). However, the question is often asked whether there still exists a justification for keeping wild animals in a zoo. .

According to the analytical psychologist, Ian McCallum, the reason why people visit zoos is because the interaction with animals is important for our own sense of being (Jackson, 2010:39). Baratay and Hardouin-Fugier (2002:13) argued that every aspect of humanity's relationship with nature can be perceived through the bars of the zoological garden, and pronounced as follows "...repulsion and fascination; the impulse to appropriate, master and understand; the progressive recognition of the complexity and specificity of the diverse forms of life". They indicated that the evolution of zoos is linked to the vast histories of colonization, ethnocentrism, violence in human relationships, and the moderation-effect of the civilization process on morals and behaviour; the creation of places of collective memory like museums; the complication of social practices; and the development of leisure activities. "To tour the cages of the zoo is to understand the society that erected them," according to them (2002:13).

The existence of zoos is regularly justified by the four pillars of recreation, research, conservation, and education. Hancocks (2001:xvii) raised the question whether these four pillars are adequate. He (2001:5-6) further argued that the attitudes of humans toward wild animals have been inconsistent. Wild animals are adored, eaten, feared, protected, worshiped, and tortured in laboratories. His viewpoint is that the only constant is our inconsistency.

He indicated that,

"The admiration that people have for wild animals is expressed by some in attempts to protect those animals and by others to shoot them for trophies. Some see the beauty of wild cats as a reason for keeping them alive in the wild, while it incites others to kill them for their fur."

The history of zoos also contains confounding events that echo our changing relationships with wild animals, and gives insight into different perceptions of different cultures over the centuries (Hancocks, 2001:5-6).

In order to survive, zoos have to continue to evolve (Schaul, 2012:8). Their roles as cultural institutions are changing in many ways. More zoos are displaying animals in enclosures close to their real habitat, and inform their visitors about whole ecosystems rather than only giving facts about animals, while some zoos are beginning to develop exhibits that deal with concepts and ideas. Instead of seeing themselves simply as exhibitors of wild animals, a number of zoos are learning to become 'storytellers'. As time goes by, more will become involved in stories of deep history and of the interactions between human cultures and wild places (Hancocks, 2001:xix).

Although there are 'stories', both strange and wonderful, in the histories of zoos, their role is becoming more important as the pressure on biodiversity increases. We need establishments that can, not only bring it to their visitors' attention what the results of their irresponsible actions towards the environment are, but also stimulate compassion for animals, and inform them about what they can do to play a role in the conservation of these animals (Hancocks, 2001:xix).

2.6 Zoos in Africa and Malaysia

2.6.1 Zoos in Africa

There once existed a number of early African civilizations, such as the kingdom of Ghana which is now Mali, during 700-1000 A.D., and the Songhai kingdom of Timbuktu, existing from 1400-1500 A.D. These early civilizations were short-lived, and it is not known whether they had any animal collections. Egypt is the only African country to have maintained animal collections throughout its history. The earliest recorded zoo was in the ancient Egyptian capital, Hierakonpolis (Jackson, 2010:39). The Giza Zoological Gardens in Cairo, Egypt, is one of the oldest of the modern zoos in Africa, and has the richest heritage (Labuschagne & Walker, 2001:331).

Many African collections of animals were not established until the 1600s when the colonial botanical stations began keeping animals. Most African zoos and aquariums were established during the 1900s, and many only since colonial independence in the 1960's (Labuschagne & Walker, 2001:331). In Africa there are currently 200 zoos of all kinds operating in 48 countries. Many are a legacy of the continent's colonial past – the Uganda Wildlife Education Centre (UWEC), and South Africa's National Zoological Gardens (NZG) being examples (Jackson, 2010:39).

On October 21, 1899, J.W.B. Gunning, the then Director of the State Museum, which is now the Ditsong Museum, moved a collection of animals from the museum's backyard to the farm 'Rus in Urbe', on the banks of the Apies River. This was the beginning of the National Zoological Gardens of South Africa (Oberholzer, 1992:10). The animals donated to the State Museum for the purpose of being stuffed for display purposes were kept in the backyard, as Gunning did not have the heart to kill them. This animal collection consisted of a serval, striped polecat, a leopard, a jackal, a genet, baboons, vervet monkeys, various antelope species, dormice, a bat, a spotted eagle owl, 50 other birds, a monitor lizard, a python, and a tortoise. Fish were added to the collection in 1910 when the City Council of Pretoria donated the Sammy Marks fountain and fish pool. Independence from the museum came in 1913, and although the zoo could not afford many animals, it served as an intermediate home for animals on their way to Europe and the United States. The zoo was given national status in 1916 (Labuschagne & Walker, 201:343-345).

The Two Oceans Aquarium opened on 13 November 1995, after eight years of research and eighteen months of construction. Situated in Cape Town at the southern tip of Africa, the Two Oceans Aquarium is ideally positioned to showcase the incredible diversity of marine flora and fauna of the Southern African coast. The aquarium showcases South Africa's rich ocean and aquatic life in six galleries (Lockhart, 2005:12). In addition to their many inspiring exhibits, the aquarium is also involved in a number of conservation and research programmes. In addition, the Two Oceans Aquarium has established itself as a key player in raising environmental awareness through its high-quality exhibits, and its conservation and education programmes (Lockhart, 2005:32-33).

The Johannesburg Zoological Gardens were started in 1904 as a small, privately-owned collection of African wildlife belonging to Sir Percy Fitzpatrick. This collection and its site were donated to the Johannesburg City Council to establish the zoo. As with most zoos, the Johannesburg Zoo has evolved from iron and concrete cages into modern, multi-species, open enclosures (Labuschagne, & Walker, 2001:344-345).

The Uganda Wildlife Education Centre (UWEC) was opened in 1952 by the colonial government as a reception centre for wild animals that were found as casualties: sick, injured, orphaned, or confiscated from illegal trade. In the early 1960s it changed its role to a traditional zoo and became known as Entebbe Zoo, where even non-indigenous species such as bears and tigers were kept as an attraction. However, as a result of the political turmoil in the 1970's and inadequate government funding, the zoo experienced a serious breakdown of infrastructure, and the loss of valuable animals. It continued on its downward slide until May 1994, when the government of Uganda recognized the need to set up an institution that would provide leadership in educating Ugandans about the benefits of conserving the country's biodiversity, one of the kingpins of the recovery process that the country was going through, as a benefit to tourism. The UWEC was founded, and has since grown to be one of the most respected Environmental Education institutions in Africa and beyond, for successfully carrying out its mandates to educate Ugandans on the importance of conserving the country's biodiversity, to rescue and rehabilitate injured, orphaned and/or confiscated wildlife, and to breed endangered wildlife species in captivity with the aim of re-introducing them back into the wild (Uganda Wildlife Education Centre, n.d.).

2.6.2 Zoos in Malaysia

Malaysia has a 12-member Malaysian Association of Zoological Parks and Aquaria, founded in 1996. Zoo Negara Malaysia, Malaysia's 'National Zoo', can trace its roots back to 1957 when the Malayan Agri-Horticultural Association organized a small collection for an annual exhibition. The popularity of this animal exhibit was such that the Association continued to exhibit animals annually. Between 1957 and 1963 the animals for exhibition were kept in the five-acre garden of V.M. Hutson, who organised the shows on behalf of the Association. In 1963 a permanent zoo site was

established at Ulu Klang, near Kuala Lumpur. An initial 36 acres of secondary jungle was converted into a zoological garden. Surrounded by jungle and rubber estates, it was called the “zoo in the jungle”. This location was eight miles from Kuala Lumpur, but by 1997 the city had grown around and beyond the zoo site (Walker, 2001:229-231).

Two older zoos existed at Johor Baru: the Johor Baru Zoo, founded in 1928, and the private collection of the Sultan. The Sultan’s collection was later discontinued. The Taiping Municipal Council founded the Taiping Zoo in 1962. It is one of the more naturalistic zoos in the country, and its 1995 Master Plan placed the emphasis on conservation, research, and education programs. The Melaka Zoological Garden was founded in 1964, and is administered by the Department of Wildlife and National Parks, Malaysia. With large open enclosures and systematic breeding programmes, it is one of the best zoos in the country. Other zoos in Malaysia include bird, reptile, and butterfly parks, and a number of roadside zoos. Most of these are privately-owned and small, but like their counterparts elsewhere, these poorly-maintained collections detract from the better facilities that are members of the Malaysian Association of Zoological Parks and Aquaria (Walker, 2001:229-231).

2.7 The different roles of zoos

The World Zoo and Aquarium Conservation Strategy states that only institutions like zoos, aquariums and botanical gardens are able to function throughout the complete range of conservation activities, from the *ex situ* breeding of endangered species, research, Environmental Education, and changing their visitors’ knowledge, understanding, attitudes, behaviour and involvement positively, to the *in situ* sustaining of species, populations and their habitats (World Association of Zoos and Aquariums, 2005a:9).

2.7.1 The recreational role of zoos

Studies of zoo visitors have shown that the main reason people visit a zoo is for family outings and other recreational reasons (Reading & Miller, 2007:86; Hancocks,

2001:xvii). The initial results of a study done at the NZG indicated that the respondents rated the need to see animals as the main motivator (Allenby, 2011).

2.7.2 Research in zoos

Zoos and aquariums are in a position to make a unique contribution to conservation-directed research since they can provide representative populations of a wide range of the world's wildlife. Zoos and aquariums serve as a platform for researchers and the public to communicate and to interpret the outcomes of research, explaining the implications for the conservation action (World Association of Zoos and Aquariums, 2005a:20). In contradiction to Hancock's (2001:xvii) statement that there are only a few trained scientists at most zoos, and that data-collection is usually for the purpose of solving captive-animal management problems rather than contributing to the scientific literature, things have changed drastically over the last couple of years. Research in zoos and aquariums has expanded in scope, quality and importance over the last decade (World Association of Zoos and Aquariums, 2005a:20).

According to the World Association of Zoos and Aquariums (2005a:21),

“There are two main divisions of research in zoos and aquariums: (1) research that is aimed at new knowledge to help the institution achieve its goals, and (2) research that is undertaken in a zoo by others to achieve their own goals, without being inconsistent with those of the organization. Under the first division would fall research on husbandry, visitor preferences, educational and interpretation methods, conservation approaches etc., to a greater or lesser extent, depending on a zoo's particular mission. The latter division would include assisting researchers from universities and research organizations by providing access to and/or material from non-domesticated species for comparative analyses.”

The World Association of Zoos and Aquariums (2005a:20) further advised that zoos and aquariums have to give priority to research that can contribute to the conservation of the populations and the habitats in the wild, in order to be more effective in delivering conservation *in situ*. Only through sustained research programmes will zoos and aquariums be successful in identifying conservation problems, in prioritizing actions, in implementing conservation interventions, and in

monitoring the effects of their actions (World Association of Zoos and Aquariums, 2005a:20).

Scientific research can also be reflective of the role of zoos in conservation and can help define that role, since the emphasis on improving zoos as cultural institutions requires empirical evidence (Wharton, 2007:188). Furthermore, zoos and aquariums need to expand their research on methods to improve re-introduction successes (World Association of Zoos and Aquariums, 2005a:17).

The conservation role of zoos and aquariums will be discussed in the next section.

Research in zoos has also established productive collaborations with academic institutions with the purpose of finding solutions to questions of wildlife conservation (MacDonald & Hofer, 2011:2-3; World Association of Zoos and Aquariums, 2005a:22). Pereboom, Leus and Van Elsacker (2011:38) stressed the fact that the key to success in building a global research community lies in investing in formal relationships with universities, research institutions and inter-governmental conservation bodies, and also by building partnerships with other zoo research departments. MacDonald and Hofer (2011:3) recommended that the zoo community has to take the initiative in doing research at the level of Taxon Advisory Groups or alternatively, work together with the academic community, and develop the research links and relationship that will foster the best outcomes.

According to MacDonald and Hofer (2011:1), research in zoos and aquariums has become a matter of urgency, since the zoo community has to plan for the future and to organise its conservation breeding efforts in order to address the changes in biodiversity and habitats. In addition, researchers conclude that the impact of zoos, as science-based conservation institutions, will become more influential as zoos become more strategic in finding a powerful balance between the importance of conservation and the new kind of cultural institution they are pre-adapted to become (Mazur & Clark, 2001:185; Miller, Conway, Reading, Wemmer, Wildt, Kleiman, Monfort, Rabinowitz, Armstrong & Hutchins, 2004: 2; Wharton, 2007:189).

2.7.3 The conservation role of zoos

The World Zoo and Aquarium Conservation Strategy defines *conservation* as the securing of long-term populations of species in natural ecosystems and habitats wherever possible (World Association of Zoos and Aquariums, 2005a:9). According to Hoffman et al. (2010:1503), conservation efforts are being outweighed by the rate of biodiversity loss. However, this rate of loss would have been one-fifth higher than what it currently is without these conservation efforts (Hoffman et al., 2010:1503).

The securing of long-term populations in zoo collections is the starting point where zoos can meet their conservation objectives from, not making a healthy captive population the ultimate goal, but the means to an end (Dickie, 2009:2). Zoos and aquariums possess a range of attributes that position them well to play a unique role in effecting *in situ* conservation. That role is recognised in the language of the Convention on Biological Diversity, signed in Rio in 1992, which is the highest legal instrument governing biodiversity conservation on the global scale (Hatchwell et al., 2007:354) and although zoos are traditionally places of recreation, some zoos are repositioning themselves as conservation organizations (West & Dickie, 2007:4: Crowther, 2011:2). The Convention on Biological Diversity also recognizes the importance of *ex situ* conservation, although in a subordinate role (International Union for the Conservation of Nature, 1992:1). Pritchard, Fa, Oldfield and Harrop (2011:18) argue that due to the increasing extinction rates being aggravated by climate change, the increased development of *ex situ* conservation approaches are needed to enhance *in situ* conservation.

Breeding in captivity is part of a zoo's conservation programme, yet not many of the threatened species involved will be released into the wild (Jackson, 2010:42). Dr. Clifford Nxomani (2011), Managing Director of the NZG, is of the opinion that an in-captivity breeding programme is just one aspect of a successful return to the wild, since these animals will again fall into the hands of poachers. He indicates that one needs to create an alternative means of income for people who are guilty of poaching; and securing habitats for animals is a difficult problem. Care should be taken not to release animals into the wild to reduce excesses in a zoo or for animal welfare reasons, since such a release would most likely increase the risk of diseases

and lead to behavioural and environmental problems with the other animals and vegetation, including dangers to both humans and animals, rather than improve the successful conservation of wild populations.

In an interview which Schaul (2012:1) conducted with Michael Hutchins, who is according to Schaul, one of the foremost experts on zoos in the world, Hutchins stated that zoos cannot continue to sell themselves only as captive breeding facilities for endangered animals. Modern zoos need to determine how they can help to protect and conserve the habitats as well, if the species are to be conserved. If no habitat exists, then it is questionable whether captive breeding programmes are warranted. In the face of climate change and other human impacts, some species would survive, and some not (Schaul, 2012:3). Consequently, research should be done and adequate precautions taken to ensure there will be no adverse impact on the existing wild populations or ecosystems. Additionally, thorough careful post-release monitoring should be done to provide sound scientific information which may influence future release attempts (World Association of Zoos and Aquariums, 2005a:15-16).

According to the World Association of Zoos and Aquariums (2005a:9), qualitative measures that indicate the successful achievement of conservation include the following, namely

- increasing secure populations of species in the wild;
- increasing areas/volumes of secure, sustainable habitat;
- greater knowledge and the application of species biology, ecology and conservation science;
- more political awareness of environmental issues with better environmentally-friendly decision-making and higher conservation priorities;
- increasing the capacity in habitat areas by means of training, education and public awareness.

An example of a success story of a captive breeding programme in a zoo is that of the Mauritius Kestrel. These birds were on the brink of extinction in 1974 due to the

loss of forest habitat and the use of DDT pesticides. The Jersey-based Durrell Wildlife Conservation Trust played an important role in saving them from extinction. Another success story is that of the Kihansi Spray Toad, one of the world's rarest amphibians for which conservation breeding is practised. Their numbers dropped from 20 000 in 1996 living in the wild to none – the result of the hydro-electric dam that destroyed their small habitat below the Kihansi Falls in Tanzania. However, there are about 6 500 of these toads at the Toledo and Bronx Zoos, and they are being re-introduced in Tanzania. The Scimitar Horned Oryx's re-introduction into protected areas in Tunisia, Morocco and Senegal is another example of successful breeding programmes in zoos (Jackson, 2010:42). Other species that were recovered from the brink of extinction by the intervention of zoos are, amongst others, the black-footed ferrets, the California condors and the Vancouver Island marmot (Schaul, 2012:3).

In order to justify the existence of zoos the question remains, namely: Even if only a few species can be saved from extinction by conservation programmes in zoos, isn't it better than the alternative of these species being lost forever?

2.7.4 The Conservation Education role of zoos

Many conservationists maintain that the lifestyles of human beings and the deteriorating environmental conditions are the greatest threat to the sustainability of wild animals and places (Crowther, 2011:2; Rockström & Karlberg, 2010:257; Schultz, 2011:1080). The zoos in developed nations are some of the best vehicles for reaching those consumers, and for motivating them to embrace their responsibility towards conservation (Crowther, 2011:2).

Jackson (2010:40) indicated that with its vast protected areas, Africa should be able to offer an intimate wildlife experience that does not require the presence of a zoo; however, Africans have become increasingly isolated from nature due to urbanization. Taking poverty into consideration, the only connection many people are likely to have with Africa's magnificent animals is by means of a visit to a zoo. Zoos provide access to animals and the natural world that people would otherwise not have been able to experience (Hancocks, 2001:xviii; Jensen, 2011:94). Zoos as

visitors' attractions in both developing and developed countries, have the potential to educate the public about wildlife conservation issues, as well as to bring about behaviour changes (Hancocks, 2001:xviii; Hatchwell et al., 2007:354; Packer, Ballantyne & Falk, 2010:12).

More than 700 million people visit zoos annually (World Association of Zoos and Aquariums, n.d.). Hence, zoos as advocates for conservation have the unique ability to inspire these millions to make concerted decisions with regard to their own places, roles and responsibilities on earth. However, although they have the opportunity to link humans to nature and to contribute conservation through the gaining of knowledge of animals and habitats, this requires some sort of visitor-interaction with the animals on display (Jensen, 2011:100; West & Dickie, 2007:5-6). Packer et al. (2010:15) found that in order to facilitate visitors' progress from experience to action, it is of particular importance for the visitors to develop an emotional affinity with the animals, and to take time to reflect on the meaning of the experience.

According to Hancocks (2001:xviii), the educational potential of zoos is largely neglected, and if zoos gave serious attention to education, they would have a greater variety in their animal collections. In the above-mentioned interview, Hutchins indicates that Hancocks is not aware of the fact that zoos often have to reduce the variety of their collections out of necessity. In order to ensure that the populations of captive animals remain viable, they have to be of a certain size. This can only be accomplished if several zoos keep that specific species, and manage them cooperatively. Furthermore, space is a limiting factor, and animals are more difficult to capture from the wild (Schaul, 2012:8). Jackson (2010:41) also reasons that, although zoos are in an excellent position to educate, many zoos fall short, because of challenges in respect of funding. The executive director of PAZAAB, Stephen van der Spuy, indicated that the Johannesburg Zoo, a wealthy institution by African standards, does not have enough staff for the volume of school children going through its gates to ensure educational interaction (Jackson, 2010:41).

It is now the time for zoos to take on their role as passionate and effective advocates of wildlife conservation and ecologically sustainable economic development (Hatchwell et al., 2007:357). Biodiversity is our life-line, in the sense that everything we eat, drink and produce is in the end derived from biodiversity, and therefore the

world economies are dependent on an intact and functioning biodiversity (Dickie, 2009:5). Zoos do not exist only to conduct research, to provide education, to entertain the public, or to promote economic activity. These are all vehicles to reach the end-goal, namely the advancement of animal and habitat conservation (Crowther, 2011:2). William Conway, former Director of the Wildlife and Conservation Society (WCS) emphasized that zoos need to increase their commitment to field-based conservation, education and science if they and their animals are to fulfil their roles as ambassadors for conservation (Schaul, 2012:2).

2.8 The role of zoos in changing knowledge and skills, behaviour, attitudes and values

Civilisations throughout the world aim to establish educational systems in order to cultivate their citizens to behave in desirable ways that is, amongst others, to be environmentally responsible. Hungerford and Volk (1990:258) define an *environmentally responsible citizen* as one who has

- an awareness and sensitivity to the total environment and its allied problems and/or issues;
- a basic understanding of the environment and its allied problems and/or issues;
- feelings of concern for the environment, and motivation for actively participating in the improvement and protection of the environment;
- skills for identifying and solving environmental problems and/or issues; and
- an active involvement, at all levels, in working towards the resolution of environmental problems and/or issues.

Knowledge is a vital part of empowerment (Schulze, 2005:57). On the whole, the earliest models of pro-environmental behaviour were based on the assumption that an advancement of environmental knowledge and skills will lead to environmental awareness and pro-environmental attitudes (Darnton, 2008:10; Kollmuss & Agyeman, 2002:241).

The different models of pro-environmental behaviour will be discussed in Chapter 3.

Looking at the characteristics of a pro-environmental citizen as defined by Hungerford and Volk (1990:258), one can conclude that to become such a person, an increase in knowledge about environmental issues and in the skills of how to solve these issues are required.

Jensen (2011:27) argues that how people understand the relationship between animals and their natural habitats have a direct bearing on zoos' efforts to promote wildlife conservation. That is, knowledge of the animal and its habitat is the fundamental building-block for learning about wildlife conservation. There is a critical link between an endangered animal and its increasingly degraded habitat, and this comprises the basis for understanding the need for conservation and the kinds of conservation strategies that are necessary (Jensen, 2011:99). Furthermore, while it may be possible to develop short-term pro-conservation visitor actions, such as once-off donations, in the absence of such understanding, to bring about a long-term and holistic commitment to conservation, requires learning about the context and the basis of the current wildlife crises.

Jensen (2011:94) found that the experience of viewing live animals can have a powerful impact on learners to construct a new understanding of wildlife, of the natural world, and of the role of humans intervening in this natural world. His research showed that visits to the zoo alone yield a statistically significant increase in scientific learning, and this impact can be increased by the zoo's educational interventions. This learning experience and the increase in knowledge can be enhanced by providing educational materials and presentations (Jensen, 2011:94). Furthermore, Johnson-Pynn and Johnson (2005:25) reported a positive increase in the knowledge of conservation of the learners who attended Conservation Education programmes in East Africa. However, the educational value of a visit to a zoo is influenced by a number of factors that precede the visit, such as prior knowledge, the mass media, age, gender, and whether it is the learner's first or subsequent visit (Jensen, 2011:94).

According to Hungerford and Volk (1990:257), "The ultimate aim of education is shaping human behaviour". The Collins Dictionary of the English Language (2010:63)

defines *behaviour* as "...the manner of behaving" or "...the response of an organism to a stimulus". *Behaviour*, in its most general sense, is what people or animals or even things do. Much of what human beings do is consistent with our learned behavioural repertoire, whether it is to do certain things, or to refrain from doing them. These behaviours are reinforced by social endorsements (Steinberg, 1980:27-28).

An *attitude* is defined as the persistent positive or negative feeling about some person, object, or issue (Kollmuss & Agyeman, 2002:252). Van den Aardweg and Van den Aardweg define an *attitude* as "...a mental or neural state of readiness, organised through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related". Attitudes exert a motivational force on peoples' behaviour, and are learnt from experiences, and at the same time, prepare us for action. They influence a person's approach-avoidance behaviour toward persons, things, occasions and thoughts. All attitudes are learned consciously or unconsciously, while some attitudes may be altered or discarded by observations and imitation through classical and operant conditioning, as well as by purposefully debating and assessing (Van den Aardweg & Van den Aardweg, 1988: 26). In fact, attitudes can indirectly influence pro-environmental behaviour (Kollmuss & Agyeman, 2002:252).

A *value* is defined as that to which a society, cultural group or individual attaches worth and significance, and that influences goals or objectives. Values are shared, and are regarded as issues of joint welfare. Furthermore, a high degree of emotional belief is attached to their importance (Van den Aardweg & Van den Aardweg, 1988:238). Values are responsible for shaping much of our intrinsic motivation to behave in a specific way (Kollmuss & Agyeman, 2002:251). In turn, *motivation* is the driving force behind behaviour change (Schultz, 2011:1080). Values are norms which hold and sustain life and society, and establish a symbiotic and interdependent relationship between humankind and the ecosystem (Goel & Goel, 2005:13). Kollmuss and Agyeman, (2002:253) came to the conclusion that although many barriers exist between environmental attitudes and pro-environmental behaviour, values and attitudes play an important role in determining pro-environmental behaviour ..

Since the causes of environmental problems, such as climate change and the loss of wild animals' habitats are the result of human activity, a change in human behaviour is needed to promote conservation actions (Schultz, 2011:1080; Litchfield & Foster, 2009:6). Schultz (2011:1080) indicates that conservation is a goal that could *only* be achieved by changing behaviour. Furthermore, if zoos can influence visitor behaviour positively towards pro-environmental behaviour, and can prove that human-animal interactions can be used to this end, they will be able to justify keeping animals in captivity (Smith, 2008:26).

According to Litchfield and Foster (2009:6), we, as a species, already have the knowledge and skills to greatly reduce the impact of our activities on the world, but as communities, there is a lack of action towards solving the problem, and part of that is related to the lack of knowledge about issues and solutions, which zoos are helping to address through their education programmes. Zoos and other conservation agencies have the opportunity to develop effective campaigns directed at changing behaviour. (Litchfield & Foster, 2009:7-8).

Knapp (2000:36-37) concluded that one of the strategies to attain the ultimate aim of Environmental Education, namely of changing environmental behaviour, is to combine formal Environmental Education programmes with non-formal programmes, and to strengthen the relationships between the non-formal and the formal educator. Institutions, like zoos and botanical gardens, can play a big role in making this happen (Knapp, 2000:39).

Falk, et al. (2010:11-12) claim that the results of their three-year nationwide study of the impacts of a visit to a zoo showed that zoos do make a difference in the knowledge of conservation and the attitudes of the visitors. This AZA-sponsored study was criticised by Marino, Scott, Lilienfield, Malamud, Nobis and Broglio (2010:127) who indicated that it contains numerous methodological weaknesses. They concluded their critique by stating that there has been no convincing evidence that zoos promote positive attitude changes, or in the education, and the interest in conservation in the visitors (Marino, et al., 2010:137). Furthermore, methodological and statistical weaknesses in the abovementioned study were pointed out by Jensen (2011:94).

Randall (2012:14) conducted a study in the Oklahoma City Zoo to assess the change in conservation attitudes of teenagers through zoo and aquarium education. His conclusion was that teenagers indicated a significant increase in their pro-conservation attitudes as a result of coming to the zoo (Randall, 2012:14). However, Bettinger, et al. (2010:448) stressed the fact that attitudes are difficult to change, and even when people verbally agree to an action, their behaviour may not change until much later, since it takes time to incorporate new knowledge into value systems, and then it is even more difficult to transform the new knowledge and values into behaviour.

In spite of the apparent difficulties in changing attitudes and behaviour, a recent study by Packer et al. (2010:15) that investigated how the visitors' characteristics and specific aspects of experience contribute to changes in their knowledge, attitudes, and engagement in environmental responsible behaviours, concluded that wildlife has the power to evoke lasting memories and transformative experiences. Their findings support the potential of wildlife tourism experiences to bring about a real change in visitors' pro-environmental behaviour. It is, however, according to this researcher, important to do a follow-up with the visitors, and to keep on giving them support in order to ensure on-going change in actions.

In addition, zoos have a unique feature that can be utilized to facilitate behaviour change, namely the ability to connect people with wildlife (Litchfield & Foster, 2009:9-10; Jensen, 2011:94; Hancocks, 2001:xviii; Jackson, 2010:40) on an emotional level. *Emotional involvement* is the extent to which we have an affective relationship with the natural world (Kollmuss & Agyeman, 2002:16). Zoo experiences have the potential to provoke a range of emotions, including happiness, interest, surprise, anger, and even fear. Smith (2008:24) reckons that this emotional arousal is positively associated with many outcomes of interest in zoos, including positive behaviour change. He (2008:44) concluded that attitudes formed through empathy are also more predictive of behaviour, meaning that, if zoos can provoke empathy for species in their collections, then attitudes formed under these conditions are likely to result in positive behaviour change.

In addition to close encounters with wildlife, zoos can promote responsible tourism practices, such as educating people not to eat 'bush meat', or to buy undesirable souvenirs that may encourage illegal trade or poaching, and to follow guidelines, such as maintaining a 'buffer distance' that protects animals from the transmission of potential disease and behavioural disturbance (Litchfield & Foster, 2009:9-10).

Zoos have the potential to elicit pro-environmental behaviour in a number of ways, namely by acquiring environmental knowledge and skills to solve environmental problems, by fostering positive attitudes and values, and by evoking the necessary emotions.

2.9 The evaluation of Environmental Education programmes

For educational programmes to achieve long-lasting effects, a change in knowledge, attitude, and behaviour has to occur. By including evaluation in these programmes the change that is envisaged will be measurable (Sterling, Wood & Lee, 2007:47; Lehnhardt, 2010:4; Bettinger et al., 2010:446). However, only a few of the newly developed educational programmes and/or educational materials have been evaluated. Zoo educators have to evaluate and publish their work in order to become creditable in the Environmental Education field. The results of the impact of Environmental Education programmes will not only reflect on the success of these programmes, but may also be used to obtain funding (Lehnhardt, 2010:4).

Many *in situ* conservation programmes are multi-dimensional initiatives targeting both biological and anthropogenic threats to wildlife and their habitats. Unfortunately many of these projects are accompanied by a sense of urgency to "do something" quickly in an attempt to provide immediate relief. As a result, the goals of the programmes are often vague or not measurable in the short-term. Indeed, only a small number of field projects include a method for evaluating the effectiveness in meeting the conservation goals. Recognizing that the true effectiveness of a conservation initiative may not be measurable for many years, there remain methods for evaluating the effectiveness of the conservation initiatives by using short-term techniques such as questionnaires, interviews and drawings (Bettinger et al., 2010: 445).

Bettinger et al. (2010:445) concluded that without measures of the effectiveness of each component of a conservation project, one will be unable to determine what contributed to the ultimate success or failure of the overall initiative. For example, if a conservation initiative includes a scientific and an educational component, both aspects of the work need to be evaluated to determine which factors contributed to the success or failure of the entire project (Bettinger et al., 2010:445).

The evaluation of Conservation Education programmes are often ignored due to a lack of understanding about how to measure the effectiveness of the programme, or to a shortage of resources (Bettinger et al., 2010:445). Bettinger et al. (2010: 448) came to the conclusion that the evaluation of Conservation Education programmes allows us to confirm that our programmes are delivering the information we intend, and that, in the end, when the wrong message is perceived, we can try a different approach.

Reading and Miller (2007:87-88) suggested that zoos should support research that evaluates the educational value of specific zoo programmes, going beyond assessing the effectiveness of education programmes, to impart knowledge to visitors. More important is the extent to which zoos can influence visitors' values, attitudes, and the associated behaviours. They also recommend that zoos should focus on areas that offer the greatest possibility of gaining knowledge and convincing arguments that will bring about change, for example children and visitors with poorly developed values and attitudes toward animals and conservation (Reading & Miller, 2007:89).

What needs to be evaluated? As stated above, if a conservation initiative includes a scientific and an educational component, both aspects need to be evaluated to determine which factors contribute to the success or failure of the entire project (Bettinger et al., 2010:445). The biological aspect of a project is typically developed using standard scientific methodology, choosing among the proven techniques to collect data on the issue at hand, whether that be a population census, feeding ecology, or social behaviour. This data are then compiled and evaluated using various statistical tests. Most field workers hold degrees and have received training in the

scientific methods of conducting biological research; however, very few are trained in sociology, or cultural anthropology focusing on humans, or other people-related disciplines (Lehnhardt, 2010:5).

Lehnhardt (2010:5) recommended that the following questions regarding Conservation Education programmes for children should be addressed, namely

- What knowledge is gained?
- Does a positive change in conservation knowledge, attitudes and behaviours persist over time?
- Is there a positive change in attitude, and does this change persist into adulthood?
- Are the children interested in initiating positive conservation behaviour after participating in an education programme?
- What barriers do the parents perceive in assisting their children with activities concerning nature?
- What are the pre-existing conservation knowledge, attitudes, and behaviour of the children attending the programmes, and how do these factors contribute to the changes observed?
- Does the programme lead to improved caring attitudes toward wildlife?
- Do the children spend more time outdoors as a result of an Environmental Education programme?
- Do the children have an improved consciousness of their environment as a result of an Environmental Education programme?

2.10 Best practices and the social context

Different cultures make use of different phrases and concepts, and even the same word can have a very different meaning once translated into a local language (Bettinger et al., 2010:448). What works in one location does not necessarily work everywhere. Bettinger et al. (2010:448) found that they had to modify their programmes in different areas in Uganda, Rwanda and the Democratic Republic of

the Congo, despite the fact that these countries are geographically close and share a similar cultural past. Although the researchers conducted their programmes in two different forest blocks in Uganda, namely the Kalinzu and Budongo Forest Reserves, only minor modifications to their programme, due to language and land-use differences, had to be done.

In general, great care has to be taken to use the correct words and terminology in the local languages. This importance cannot be underestimated in adapting programmes across country and cultural lines (Bettinger et al., 2010:448).

Sterling, et al. (2007:47) recommended that Environmental Education programmes that are responsive to diverse populations should be developed, and that alternative ways should be sought to reach new audiences who do not share the same conservation values.

2.11 Report on the evaluation of Conservation Education programmes: case studies

An exploratory study that was done in East Africa by Johnson-Pynn and Johnson (2005:25) describes two programmes, namely the Jane Goodall Institute's Roots and Shoots (R&S), and the Wildlife Clubs of Uganda (WCU).

The aims of this study was to (a) describe the group characteristics and programme activities; (b) assess the programme's impact on the learners' conservation knowledge and areas of personal and social development; and (c) identify major successes and challenges faced by the R&S and the WCU programmes (Johnson-Pynn & Johnson, 2005:25-26).

The researchers studied school-based programmes in ten communities adjacent to national parks and wildlife sanctuaries. The missions of both the R&S and the WCU programmes are to educate the youth about the environment, the animals and the people in their communities. The programmes both involved school-based learner groups, while the teachers and regional programme coordinators acted as facilitators.

Both programmes involve similar hands-on activities, focusing on the environment, the communities and personal development.

Johnson-Pynn and Johnson (2005:27-28) made use of focus group - and personal interviews with key informants, observations and participatory experiences as methodology (Johnson-Pynn & Johnson, 2005:27-28). The challenges that these programmes faced included the lack of parental and community support, the prioritization of sports activities by school administrators, harsh weather conditions and poor communication between the clubs and the programme coordinator offices. The most common problem was a lack of resources. Other challenges included problems resulting from rebel uprisings near the Ugandan border with the Congo and Sudan. Robberies, bloodshed, abduction, and the torturing of the youths who are forced to serve in rebel armies, are common in this area (Johnson-Pynn & Johnson, 2005:35).

Johnson-Pynn and Johnson (2005:30) concluded that the R&S and the WCU programmes in the developing countries of Tanzania and Uganda had as result a notable increase in the knowledge of conservation, in promoting the learners' personal and social development, and in raising community awareness. According to Johnson-Pynn and Johnson (2005:30), the R&S and the WCU offer quality Conservation Education programmes that increase the knowledge of conservation and have a positive impact on the participants in the programmes, and on East African communities and their ecological systems. The researchers emphasized that, although their research has indicated that the programmes are successful in achieving their aims, a key methodological consideration, namely that of social desirability should be taken into account when interpreting the results. Johnson-Pynn & Johnson (2005:30) are of the opinion that their results may have been inflated because of the possibility that the participants wanted to please the researchers. The successes and challenges of the R&S and the WCU programmes in Tanzania and Uganda emphasize the importance of considering circumstantial factors when designing best practises in Conservation Education (Johnson-Pynn & Johnson, 2005:25).

Another study on the evaluation of Conservation Education programmes in Africa is that by Bettinger et al. (2010:445). These researchers assisted with the evaluation of

an education programme at a chimpanzee sanctuary in Uganda. The message of this education programme was that chimpanzees are endangered animals that live in the forest with their families and that we, as humans, should help to protect the forest so that these animals would have a place to live. The programme was evaluated by means of a short pre- and post- questionnaire.

Bettinger et al. (2010:448) found that the learners easily misinterpreted images used in this programme. It appeared that without reading the content of signage they can be influenced by the images before they even see the animals. These findings have application in other settings like zoos and nature, where images are used to convey conservation messages to the visitors. Evaluating the message portrayed by the graphics is important to ensure the intended message is perceived correctly. The researchers concluded that evaluation is crucial to confirm that Conservation Education programmes are delivering the intended messages and that these programmes are culturally acceptable (Bettinger et al., 2010:448).

The evaluation of zoo programmes is not new, although it is often ignored. A study by Gutiérrez de White and Jacobson (1992:209) in Cali, Colombia had as its aim to evaluate the effect of the zoo-based educational programmes of the Cali Zoological Park on the knowledge and attitudes of learners toward wildlife conservation. The objectives of the study were (a) to develop a hands-on programme in wildlife conservation for primary school educators, (b) to evaluate the impact of this programme by measuring the knowledge gained and the improvement in the attitudes of the learners who attended this programme, and (c) to compare these results with those obtained by the learners who attended two other Conservation Education programmes in the zoo.

The target group for this study (n=1015) was grade 4-learners from 26 randomly selected primary schools. The methodology used were pre- and post-visit questionnaires that were administered before and after the learners were exposed to one of four experimental treatments, namely a zoo workshop directed toward their educators and followed by a visit to the zoo, a visit to the zoo preceded by an audio-visual show, a zoo visit only, and control treatment (Gutiérrez de White & Jacobson, 1992:208).

The results indicated that favourable attitudes toward conservation could be fostered in young learners by improving the educators' knowledge of conservation-related topics. The researchers concluded that exposure to wild animals only is insufficient to obtain affective and cognitive gains in primary school learners. They recommended that the zoos should support the development of Conservation Education programmes involving educator participation, and that these programmes should be evaluated and revised to increase their effectiveness in increasing an improvement in the knowledge and attitudes of their audiences (Gutiérrez de White & Jacobson, 1992:209).

Kocanjer, Balavage, Lehnhardt, Mellen, and Heimlich (2009:32-37) conducted research at Disney's Animal Kingdom with the purpose of assessing the effectiveness of the Kids' Discovering Clubs (KDC) in inspiring young children to learn about wildlife. The KDC is a series of child-focused activity stations which provide activities for children aged 5 to 8 years to learn about animals, and how they can help conserving wildlife (Kocanjer et al., 2009:32).

The researchers made use of interviews based on photographs that symbolized what the children had just learnt. The children were tested on both their knowledge and their intent to embrace conservation activities (Kocanjer et al., 2009:34). The sample size of the study comprised of 552 interviews with the children and their parents. A control group of 132 children were also interviewed. This control group served to identify pre-knowledge on the content of the KDC. Comparing the two groups permitted the researchers to measure the change in knowledge as a result of the KDC activity (Kocanjer et al., 2009:35).

The results of the research indicated that the knowledge of the children who attended the KDC was meaningfully higher than that of the control group. This finding proposes that young children of 5 to 8 years old can recollect and understand new wildlife information shared in a fast-paced, theme-park setting, and conducted by trained zoo educators. Furthermore, the results showed the children wanted to help conserve wildlife and have clear preferences for particular conservation activities. The researchers noted that the parents were very supportive in helping their children to adopt pro-conservation behaviour (Kocanjer et al., 2009:36-37). The researchers

concluded that if we want the children to demonstrate pro-conservation behaviour, conservation activities that the children enjoy and that their parents will support must be offered both at the zoo and at home (Kocanjic et al., 2009:37).

Jensen (2011:4) claims that the study he conducted in the London Zoo is the "...largest (n=3018) and most methodologically robust investigation of the educational value of zoos for children and adolescents ever conducted worldwide".

The aim of this study was to evaluate (a) the impact of the London Zoo structured non-formal learning programmes and unguided zoo visits, (b) learner's development of new knowledge; and (c) the learners' perceptions of zoos, of science, and of wildlife conservation. Jensen based his study on the national and international perceptions that the promotion of an understanding of animal adaptation and habitats are key emphases for zoo-based education (Jensen, 2011:4).

The mixed-methods approach, namely quantitative and qualitative surveys were administered. Quantitative data-collection by means of pre- and post-visit questionnaires was used to evaluate this sphere of the learners' thinking. An open-ended survey was included to identify a broader range of potentially unforeseen perceptions of the learners that attended the ZSL London Zoo's structured non-formal learning programme. Different variations of these mixed-methods survey instruments were used for primary schools and secondary schools, and on zoo visits versus outreach visits. Drawings were used to elicit the learners' understanding of habitats and the animals, by requesting them to draw their "favourite animal where it lives in the wild" both before and after their visit to the zoo, or before and after attending a structured non-formal programme at the zoo (Jensen, 2011:8-11).

The results of this study illustrated that there was a significantly strong increase in the learners' knowledge about animals and habitats from pre- to post-zoo visits (Jensen, 2011:4). The research showed that visiting a zoo can result in both positive and negative learning outcomes. The chance of a negative outcome is big when there is not some kind of interaction with live animals, for example in outreach zoo programmes. Negative outcomes for on-site programmes are more likely when the learners have not been supplied with conceptual tools, for example worksheets, to

make the most their viewing of the live animals. Alternatively, positive outcomes can be considerably enhanced by the provision of such conceptual tools (Jensen, 2011:100).

This research further indicated that for those learners who enter the zoo with a positive or neutral perception of zoos and the effective support of their teachers, parents or other sources, self-guided visits can yield a significant improvement in their knowledge and an increase in their pro-conservation attitudes. However, learners without support are more likely to benefit from structured non-formal educational programmes or guided visits to facilitate learning from the zoo collection. Nevertheless, even with self-guided visits, the learners demonstrated a positive development on at least one of the dimensions included in the survey instrument (Jensen, 2011:100).

Jensen (2011:100) concluded that this study provides "...for the first time large-scale, reliable and generalizable evidence of zoos' positive impact on learners' scientific and conservation learning". Jensen (2011:100) further recommended that zoos should utilize the findings of this study, namely that their structured non-formal educational programmes as well as their unguided visits can yield significantly improved learning outcomes to their advantage.

2.12 Summary

The main question put forward in this literature review is whether zoos can influence the learners' pro-environmental behaviour after attending Conservation Education programmes.

The chapter began by examining the problem that zoos are trying to combat, which is, ultimately, the loss of biodiversity. The literature illustrates that biodiversity is being lost at an alarming rate. At the same time it also reflects the importance of biodiversity for humans to survive, since it provides the basis for ecosystems and the services they provide on which humans depend. The main threat of the loss of biodiversity is the growing human population, and all its associated needs.

The next section of this chapter looked at the global environmental crises, and positioned the loss of biodiversity within this global perspective. Again scientific evidence illustrated that we are facing a daunting task of finding a balance between cultural, economic, social and environmental values in order to conserve biodiversity, to sustain the generations of the future.

Following on these sections that aimed to demonstrate how serious the environmental problems we are facing are, is the section dealing with finding a solution to these problems by means of Environmental Education. Firstly, the roots of Environmental Education were established, and the history of the development of Environmental Education was reviewed shortly. It was clear from the literature that was reviewed that Environmental Education develops simultaneously with the increase in environmental problems. Different definitions of Environmental Education were discussed, and their objectives were stated. Next, the place of Conservation Education within the Environmental Education sphere was established. Different terminologies and definitions are being used. For the purpose of this study Conservation Education would be used when referring to the educational programmes offered in zoos. Furthermore, the evaluation of Conservation Education programmes is important to confirm that these programmes are successful in achieving their aims.

In the following section the place of zoos in modern society was established by reviewing the history of zoos, and the views of different role-players were stated. Zoos have changed over the centuries from the ancient collections to the cultural institutions that we are familiar with. African zoos mainly started off as colonial menageries, and the zoos in Malaysia as private collections.

Furthermore, the World Association of Zoos and Aquariums' (2005b:9) claim that zoos are able to function throughout the complete range of conservation activities, from the *ex situ* breeding of endangered species, research, Environmental Education, and changing their visitor's knowledge, understanding, attitudes, behaviour and involvement positively, to the *in situ* sustaining of species, the population and their habitats (World Association of Zoos and Aquariums, 2005a:9). The conclusion of this section is that zoos do not merely exist for recreation, for conducting research, or for

providing education, since these are all only the means to reach the end-goal, namely the advancement of animal and habitat conservation (Crowther, 2011:2).

The role of the zoos in changing knowledge, skills, behaviour, attitudes and values was examined in the next section. Evidence found in the literature illustrates that zoos have the potential to evoke pro-environmental behaviour (Litchfield & Foster, 2009:7-8; Knapp, 2000:36-37; Falk et al., 2010:11-12; Packer et al., 2010:15), but very little research has been done in this field. It is clear from the literature that a change in behaviour is needed in order to conserve biodiversity. Different Models of pro-environmental behaviour change will be discussed in the next chapter.

Since this study is a comparative evaluation of Conservation Education programmes in three different countries, the next section dealt with the best practices in different social contexts. The conclusion from the literature reviewed is that great care has to be taken to use the correct concepts and terminology, since different cultures attach different meanings to them. For that reason a pilot study to evaluate the research tools was considered important. An evaluation of the programmes allows one to ensure they are ethnically acceptable and appropriate (Bettinger et al., 2010:448; Lehnhardt, 2010: 5; Sterling et al. 2007: 47).

The case studies discussed in the last section of this chapter illustrated an increase in the learners' knowledge about wild animals and their habitats, and some of them claimed an increase in pro-conservation attitudes and in the intent to adopt pro-conservation behaviour.

CHAPTER THREE

THE RESEARCH DESIGN

*“Education is what survives when
what has been learned has been forgotten”.*

- B.F. Skinner -

3.1 Introduction

The purpose of this study is to develop a model for an effective zoo Conservation Education programme by means of comparatively evaluating the Conservation Education Programmes of the National Zoological Gardens of South Africa (NZG), the Uganda Wildlife Education Centre (UWEC), and Zoo Negara, Malaysia.

This chapter first of all deals with identifying a theoretical framework on which this research will be based. What determines human behaviour, and which factors play a role in pro-environmental behaviour are discussed. Thereafter, behavioural models and pro-environmental behaviour theories, as well as the learning theories that are used in the zoo programmes as a means of facilitating pro-environmental behaviour, namely social constructivism and experiential learning, are discussed. The researcher adapted the Pro-environmental Behaviour Model of Kollmuss and Agyeman (2002:257) as a theoretical framework for this study.

The mixed-methods research design was used in this study, and concurrent triangulation is the strategy used for the collection of the data. To start off, the nature of mixed-methods research, as well as the philosophical assumptions on the knowledge claims is elaborated upon. The researcher developed a visual model of the mixed-methods strategy for this study. The methods used to collect the data, the research instruments, the sampling techniques, data analyses, the validity and reliability for both the quantitative and qualitative sections of the study are explained in detail.

The results that the quantitative study was designed to provide, is that of benchmarking the NZG's Conservation Education programmes against those of other international zoos, while the qualitative study aimed to provide the criteria for a successful Conservation Education programme. The interpretation and integration of the data will result in a model for an effective zoo Conservation Education programme. The interpretation and integration of the data are discussed in Chapter 5.

The delineation and limitations of the study, as well as the ethical considerations are discussed towards the end of this chapter.

3.2 The research paradigm

“Teaching

We meet awkwardly.

I invite you to walk.

I find you dancing.”

- Jeff Astley -

As described in Chapter 2, it is clear that the greatest threat to the sustainability of wild things and wild places and the health of the environment is the consequence of the behaviour of humans. Therefore, the solution for many of our environmental problems and the sustained existence of biodiversity lie in changing the way we think and behave (Balmford & Cowling, 2006:692; Crowther, 2011:2; Lichfield & Foster, 2009:6; Rockström & Karlberg, 2010:257; Schultz, 2011:1080). Education presents our best chance of promoting and securing the values and behaviour which sustainable development implies (Hungerford & Volk, 1990:267; United Nations Educational, Scientific and Cultural Organization, 2007:16). However, there is a need for transformative education, namely education that helps to bring about the fundamental changes demanded by the challenges of sustainability. Ensuring sustainability depends on developing more caring relationships between people and nature, as well as enabling environmentally and socially responsible behaviour (United Nations Educational, Scientific and Cultural Organization, 2007:16-17).

The IUCN and Tbilisi definitions of Environmental Education, as well as the Tbilisi Principles of Environmental Education, are often stated within the behaviourist paradigm (Schulze, 2005:63). This was discussed in Chapter 2, section 2.4.2. Furthermore, zoo Conservation Education programmes attempt to change the learners' knowledge, skills, attitudes, and values and ultimately, their behaviour, as was discussed in Chapter 2, section 2.8.

Consequently, the theories used as basis for this study are those that attempt to clarify a change in human behaviour. However, the researcher acknowledges the fact that numerous theoretical frameworks have been developed to explain the

discrepancies between knowledge, attitudes and pro-environmental behaviour, for example pro-social theories, altruism, empathy and community social marketing. Furthermore, different learning theories underpin the learning approach that was used in the Conservation Education programmes that were evaluated in this study to try and ensure a behavioural change, namely social constructivism and experiential learning.

3.2.1 Models and theories of behaviour

“Is not this poor child without knowledge, strength, or wisdom, entirely at your mercy? Are you not the master of his environment so far as it affects him?

Cannot you make of him what you please?

His work and play, his pleasure and pain, are not, unknown to him, under your control? No doubt he ought only to do what he wants, but he ought to want to do nothing but what you want him to do.

*He should never take a step you have not foreseen,
nor utter a word you could not foretell.”*

- Plato's instruction to the tutor in *Emile* - Steinberg -

Behaviourism was first recognized in the early 1920's, and is so called because it attempts to reduce all of man's activity, including his thinking, feeling and willing to the level of observable behaviour (Kolesnik, 1970:12-13). It attempts to explain human behaviour in physical terms, mainly as conditioned responses. It is also called 'positivism', due to its ideal that concepts (and the proclamations to which they are linked) should be derived from the evidence of observation. According to this view, by observing people's behaviour we are able to formulate laws concerning behaviour. This, in turn, enables us to envisage, and even control human behaviour (Schulze, 2005:61). Behaviourism still forms the basis of many of the teaching-learning actions in modern classrooms (Higgs & Smith, 2000:52).

The founder of behaviourism is John B. Watson (Kolesnik, 1970:12; MacMillan, 1973:15). His work is classic in the field of behaviour modification, since it was the first time that a human emotional reaction was conditioned in an experimental setting.

He concluded that an emotional response can be conditioned, that it can be transferred to stimuli other than the initial stimulus which evoked the emotion, that the emotion would last for a period of time, and that it can be unlearned (MacMillan, 1973:15). It was believed that the effectiveness of the conditioning process could be increased by a clear and precise statement of objectives, and this would lead to a schedule of learning that would minimise error and choice. This reflected Watson's much criticized claim that a controlled environment is one in which a child could be engineered into any kind of desired person (Higgs & Smith, 2000:5). However, his theory has undergone considerable modifications since it was first developed.

B.F. Skinner (1904-1990) personalized behaviourism and attempted a scientific approach to the study of human behaviour. According to Skinner's theory, human behaviour is grounded in the results of our actions. He attempted to predict human behaviour (Higgs & Smith, 2000:58-59). Later Thorndike formulated his 'connectionism theory', according to which, learning is the formation and strengthening of bonds or connections between stimuli and responses (Kolesnik, 1970:196-197). Combinations of revised versions of Watson's theory of behaviourism and Thorndike's connectionism theory have resulted in 'neo-behaviourism' (Kolesnik, 1970:199-200). Neo-behaviourists are united in their belief that behaviour which appears to be purposeful is the consequence of some stimuli being more potent than others in a particular situation, thus causing a person to react in one way rather than in another (Kolesnik, 1970:199-200).

The strongest criticism against the behaviourism theory is that it claims to be able to control and manipulate human behaviour, and it thus sees humans as objects, and quantifies human behaviour. It ignores the fact that humans have a free will and can choose whether to be controlled or not (Van den Aardweg & Van den Aardweg, 1988:29). Nevertheless, conditioning does help to explain some of the simpler forms of human learning, particularly those which are emotionally toned in nature. Also, reinforcement has positive educational implications, for it is used all the time in the form of praise, acceptance, and compliments to motivate the individual to greater heights. Behaviours that are reinforced are more likely to recur (Van den Aardweg & Van den Aardweg, 1988:29). The behaviourist approach may have positive value for Environmental Education if people's destructive behaviour towards the environment

can be changed for the better (Engleson & Yockers, 1994:62). This should, however, not be done by manipulating and controlling people (De Jager, 2004:33).

Motivating people to adopt a more environmentally-friendly lifestyle is an intricate matter, involving more than simply increasing knowledge about, and developing a positive attitude towards the environment. Different models depicting the factors that need to be addressed when seeking to create a desired change in behavior are described in section 3.2.2.

3.2.2 Pro-environmental behaviour theories

Also referred to as *conservation behaviour*, *environmentally-significant behaviour* and *responsible environmental behaviour*, pro-environmental behaviour has become the focus of much research (Smith, 2008:65). *Pro-environmental behaviour* is defined by Kollmuss and Agyeman (2002:240) as behaviour that consciously seeks to minimize the negative impact of one's actions on the natural and built world. According to Bamberg and Möser (2007:15), *pro-environmental behaviour* is best viewed as a mixture of self-interest, for example to pursue a strategy that minimises one's own health risk, and of concern for other people, for example the next generation, other species, or whole ecosystems.

The earliest models of pro-environmental behaviour (figure 3.1) were grounded on a linear advancement of environmental knowledge, leading to environmental awareness and attitudes. These models were soon confirmed to be wrong, since research showed that in most cases increases in knowledge and awareness do not lead to pro-environmental behaviour. However, many environmental non-governmental organisations (NGO's) today still base their communication approaches on the assumption that more knowledge will lead to pro-environmental behaviour (Kollmuss & Agyeman, 2002:241).

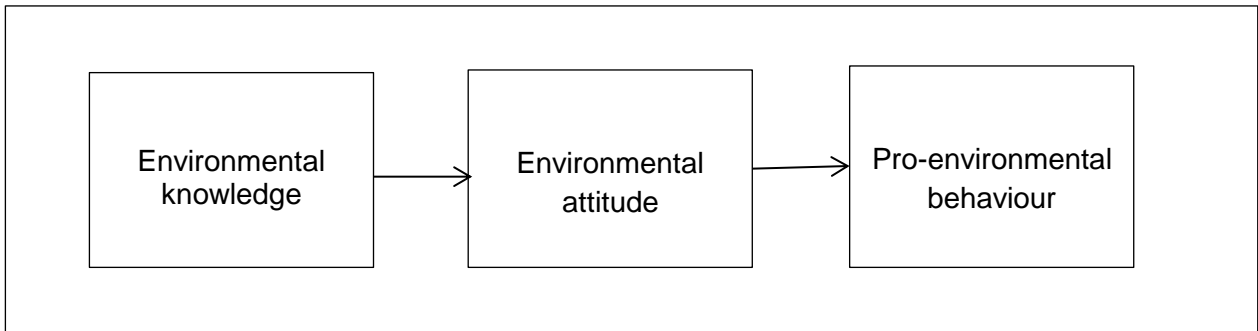


Figure 3.1: Early models of pro-environmental behaviour

(Kollmuss & Agyeman, 2002:3)

Researchers who regard *self-interest* as the more important motive for behaviour change often rely on rational choice models, for example the Theory of Reasoned Action (Regis, 1990, in: Kollmuss & Agyeman, 2002:243). The Theory of Reasoned Action (figure 3.2) was developed by Martin Fishbein and Icek Ajzen. Their model has been the most influential attitude-behaviour model in social psychology. They developed a mathematical equation that articulated their model, which enabled researchers to conduct empirical studies (Regis, 1990, in: Kollmuss & Agyeman, 2002:243). The Theory of Reasoned Action is explicitly concerned with behaviour. However, this theory also recognizes that there are factors that limit the influence of attitude on behaviour. Therefore, the Theory of Reasoned Action predicts behavioural intention, a compromise between stopping at attitude predictions and actually predicting behaviour. Because it separates behavioural intention from behaviour, the Theory of Reasoned Action also discusses the factors that limit the influence of attitudes (or behavioural intention) on behaviour.

The Theory of Reasoned Action uses two elements, namely attitudes and norms to predict behavioural intent. Specifically, the Theory of Reasoned Action predicts that behavioural intent is created or caused by two factors, namely our attitudes and our subjective norms. Attitudes have two components. Fishbein and Ajzen (1975:5) call these, "...the evaluation and strength of a belief". The second component influencing behavioural intent, subjective norms, also has two components, namely normative beliefs and motivation to comply. The implications of the Theory of Reasoned Action for Environmental Education are that individuals with more positive attitudes towards the environment are more likely to demonstrate pro-environmental behaviour

(Halpenny, 2005:2). One of the limitations of this model is the assumption that people act rationally (Regis, 1990, in: Kollmuss & Agyeman, 2002:243).

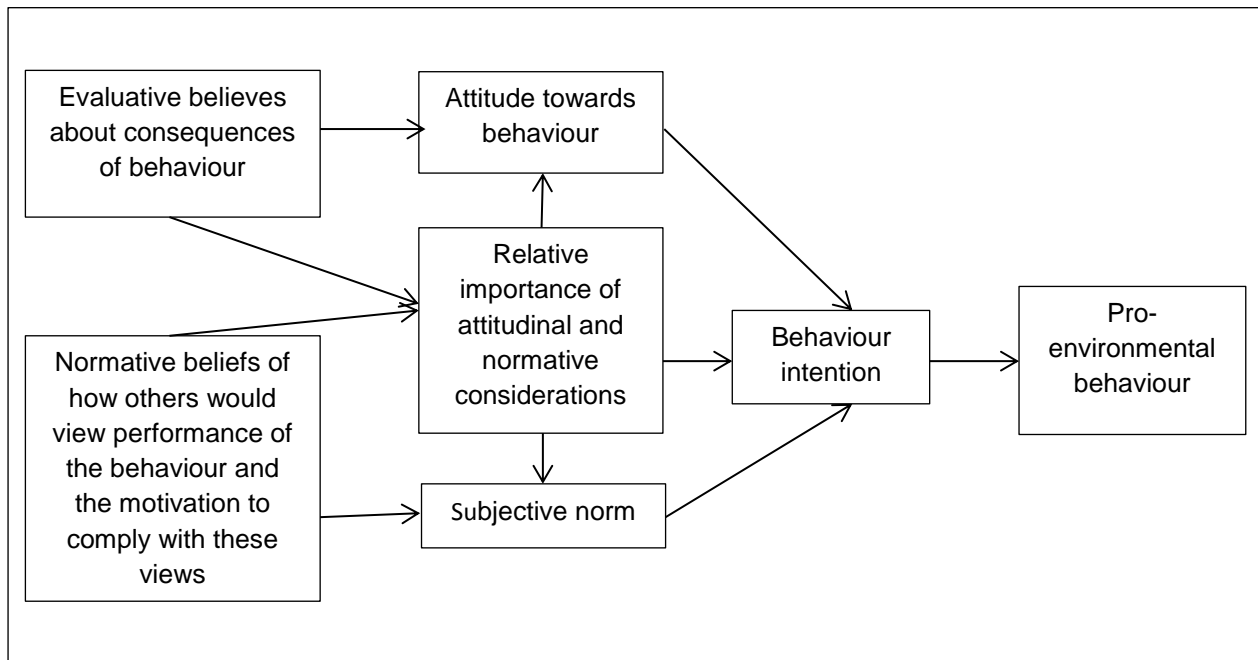


Figure 3.2: The Theory of Reasoned Action

(Ajzen & Fishbein, 1980, in: Kollmuss & Agyeman, 2002:243)

Hines, Hungerford, and Tomera (1986:1-8) published their meta-analysis of research on responsible environmental behaviour (figure 3.3) in 1986. This model was based on Ajzen and Fishbein’s Theory of Reasoned Action (Kollmuss & Agyeman, 2002:243; Hungerford & Volk, 1990:259), and had as its aim to identify variables reliably associated with pro-environmental behaviour, as well as to determine quantitatively the strengths of these relationships (Hungerford & Volk, 1990:259; Kollmuss & Agyeman, 2002:243; Bamberg & Möser, 2007:14). Against the background of their meta-analytical results, the researchers suggested a model of environmental behaviour which sees the intention to act and the objective situational factor as direct determining factors of pro-environmental behaviour. *Intention* itself is viewed as summarising the interplay of cognitive variables, namely action skills, knowledge of action strategies and issues, as well as personality variables, namely attitudes, locus of control, and personal responsibility (Bamberg & Möser, 2007:15).

Kollmus and Agyeman (2002:243-244) are of the opinion that, although this model is more sophisticated than the one by Ajzen and Fishbein, the identified factors do not sufficiently explain pro-environmental behaviour, because the relationship between knowledge and attitudes, attitudes and intentions, and intentions and actual responsible behaviour, are weak. According to Kollmus and Agyeman (2002:244) Hines, et al. (1986) called these factors *situational factors*, and included opportunities to choose different actions, economic limitations, social pressure, and opportunities to choose different situations from. Nonetheless, this study made a strong impact on the further research on psycho-social determinants of pro-environmental behaviour. Using modern statistical methods for synthesising the results of a body of primary studies, it provided convincing empirical evidence for the use of psycho-social variables as predictors of pro-environmental behaviour. This finding encouraged many researchers to continue their research on psycho-social determinants of pro-environmental behaviours (Bamberg & Möser, 2007:15)

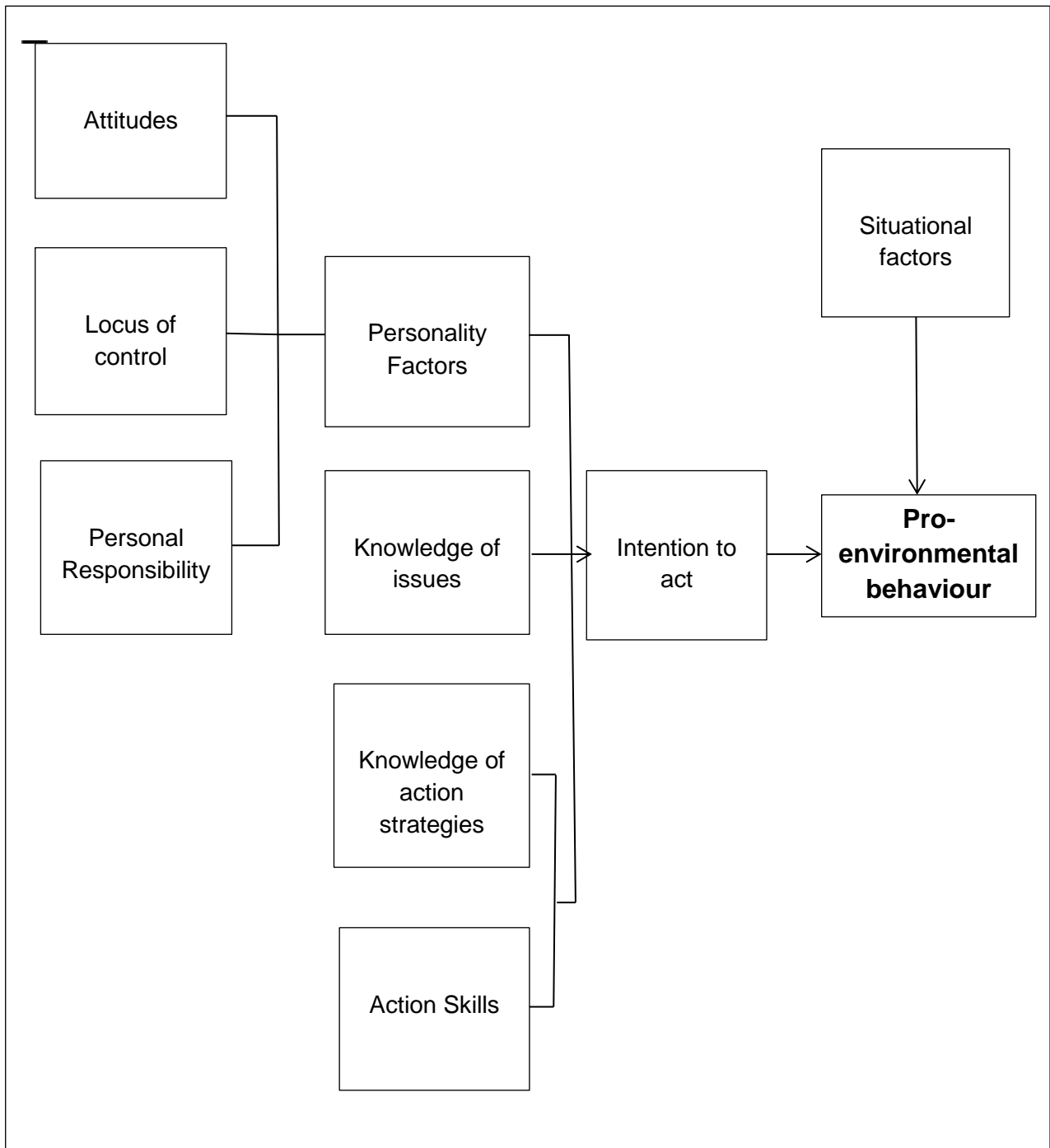


Figure 3.3: The Hines Model of Pro-environmental Behaviour

(Hines et al., 1986:7)

Hungerford and Volk (1990:264) identified critical educational components that, when implemented, can maximize the opportunities to change learner behaviour in respect of the environment.

They indicated that this can be achieved if the educational agencies -

- teach environmentally-significant ecological concepts, and the environmental interrelationships that exists within and between these concepts;
- provide carefully designed and in-depth opportunities for the learners to achieve some level of environmental sensitivity that will promote a desire to behave in appropriate ways;
- provide a curriculum that results in an in-depth knowledge of issues;
- provide a curriculum that teaches the learners the skills of the analysis and investigation of issues, as well as provide the time needed for the application of these skills;
- provide a curriculum that teaches the learners the citizenship skills needed for the remediation of issues, as well as the time needed for the application of these skills; and
- provide an instructional setting that increases the learners' expectancy of reinforcement for acting in responsible ways, i.e., in attempting to develop an internal locus of control in the learners.

Hungerford and Volk (1990:267) came to the conclusion that although it may be true that the awareness of issues in some cases lead to behaviour change, this is not the case in respect of pro-environmental behaviour. They indicated that if environmental issues are to become an integral part of instruction designed to change behaviour, instruction must go beyond an 'awareness' or 'knowledge' of issues. The students must be given the opportunity to develop a sense of 'ownership' and of 'empowerment' so that they may be fully capitalised in an environmental sense, and be encouraged to become responsible active citizens. The above researchers are of the opinion that pro-environmental behaviour can be developed by means of Environmental Education, but that the challenge then is to take on a new methodology (Hungerford & Volk, 1990:267). They presented a new model, illustrated in Figure 3.4, which proposed three types of antecedent variables in a causal chain leading to environmental citizenship behaviour - entry level, ownership, and empowerment

variables. Each of these variables can further be divided into those that are of major importance, and those of minor importance (Smith, 2008:66).

Wals and Van der Leij (1997:51-52) criticized Hungerford and Volk's approach to Environmental Education on grounds of the fact that it has a behaviouristic approach, and that, according to them, Hungerford and Volk's methods represent contemporary protocols of behaviourism that they called 'behaviourism in disguise'. Wals and Van der Leij's (1997:51) criticism against behaviourism is that it takes on a positivism instrumental view of behaviour. They do not agree with the methods being used, namely that the world can be predicted and controlled as they see it depicted in the work of Hungerford and Volk since other factors, for example the improved understanding among people, the release of human potential and the formation of a sustainable relationship with the environment may be overlooked. They also indicate that Environmental Education should not be defined in terms of desired behavioural outcomes, namely 'citizenship behaviours', 'responsible environmental behaviours' and 'quality of life', as described by Hungerford and Volk (1990), since these are ill-defined concepts. They also see the intervention strategies to promote these concepts as environmental conditioning, and not as education.

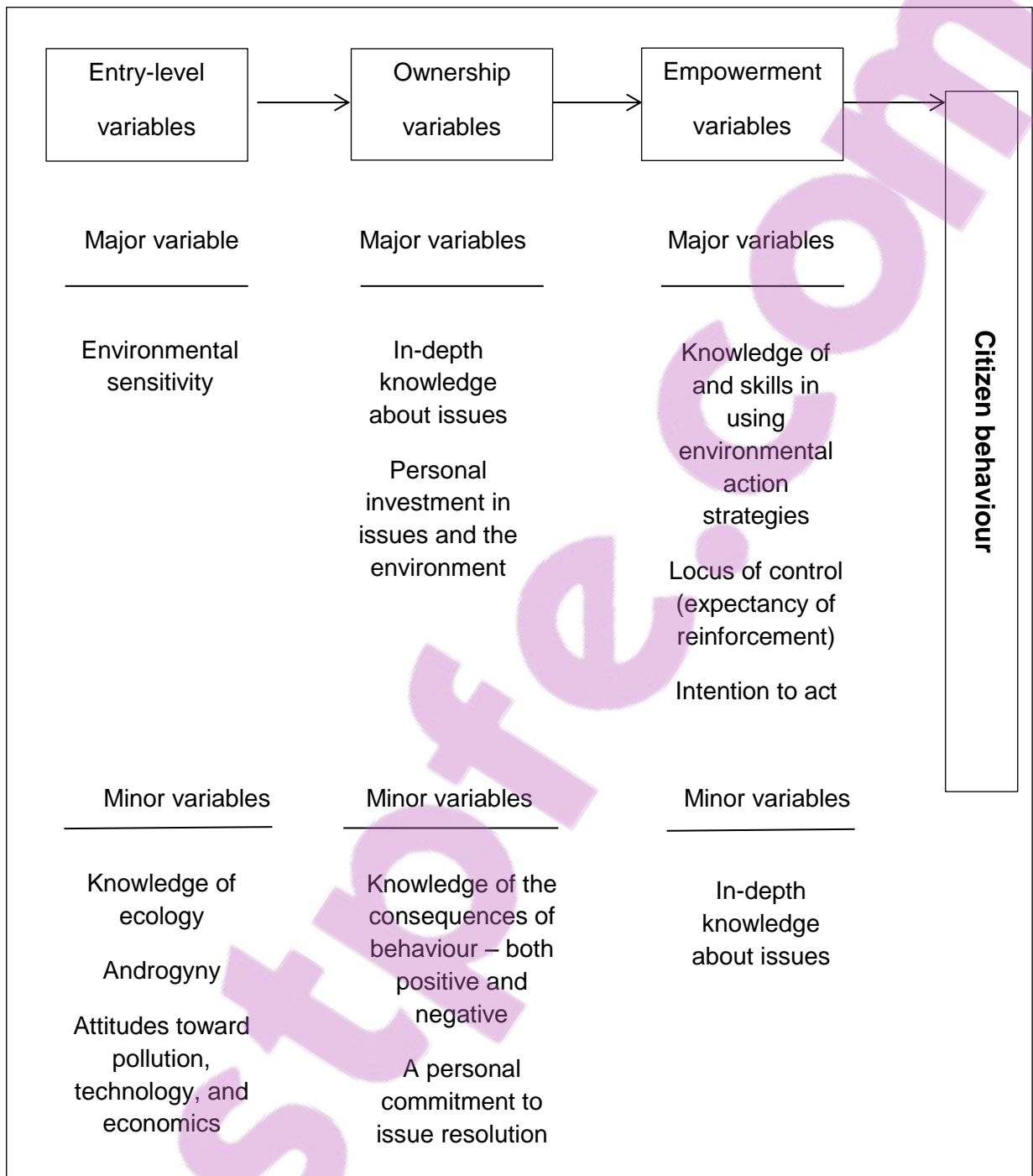


Figure 3.4: The Hungerford and Volk Model of Environmental Behaviour: Major and minor variables involved in environmentally-responsible behaviour

(Hungerford & Volk, 1990:260)

Kollmuss and Agyeman (2002:249) indicate that it is not possible to give a diagrammatic representation of how pro-environmental behaviour is formed. They distinguish between the following factors that influence behaviour change, namely demographic factors, e.g., institutional, economic, social and cultural factors, and internal factors, e.g., motivation, knowledge of the environment, awareness, values, attitudes, emotions, locus of control, responsibilities, and priorities. According to Kollmuss and Agyeman (2002:249), the difficulty in defining and delimiting these different factors is due to the fact that they are mostly broadly and vaguely defined, that they interrelate, and often do not have clear boundaries. Furthermore, behaviour change need to occur at both individual and community level in order to achieve sustainability (Kollmuss & Agyeman, 2002:249). At the same time, behaviour change is influenced by many factors, including one's upbringing or social environment, and his/her belief in the ability that he/she can bring about change (Litchfield & Foster, 2009:6-8). In a study that she did in Norway and Kentucky, Chawla (2006:59) found that positive experiences of natural areas in childhood and adolescence, and family role models were the most frequent motives for environmental activism. Other factors playing significant roles, decreasing in value, are, namely the pro-environmental values held by the family, the pro-environmental organizations, the role-models and education (Chawla, 2006:60).

Figure 3.5 indicates a model of pro-environmental behaviour, illustrating some of the factors that play a role in changing behaviour patterns to pro-environmental behaviour. This model was developed by Kollmuss and Agyeman (2002:257). The arrows in the figure indicate how the different factors influence one another, and also pro-environmental behaviour. The two narrower arrows from internal and external factors directly to pro-environmental behaviour indicate environmental actions that are taken for other than environmental reasons. The biggest positive influence on pro-environmental behaviour, indicated by the larger arrow, is achieved when internal and external factors act synergistically. The black boxes indicate possible barriers to positive influence on pro-environmental behaviour. This model lists only a few of the most important barriers. In the diagram the largest black box represents old behaviour patterns, not only for graphical reasons, since this barrier has to block all three arrows, but also since the researchers wanted to emphasise the fact that old habits form a very strong barrier that is often overlooked in the literature on pro-environmental

behaviour (Kollmuss & Agyeman, 2002:257). What must further be taken into account is that the past behaviour people are already engaging in are likely to continue, and that messages received about those behaviours only serve to reinforce them as worthwhile (Smith, 2008:64). At the same time, having knowledge about current behaviour means that the most accurate predictor of future behaviour can be identified (Smith, 2008:69).

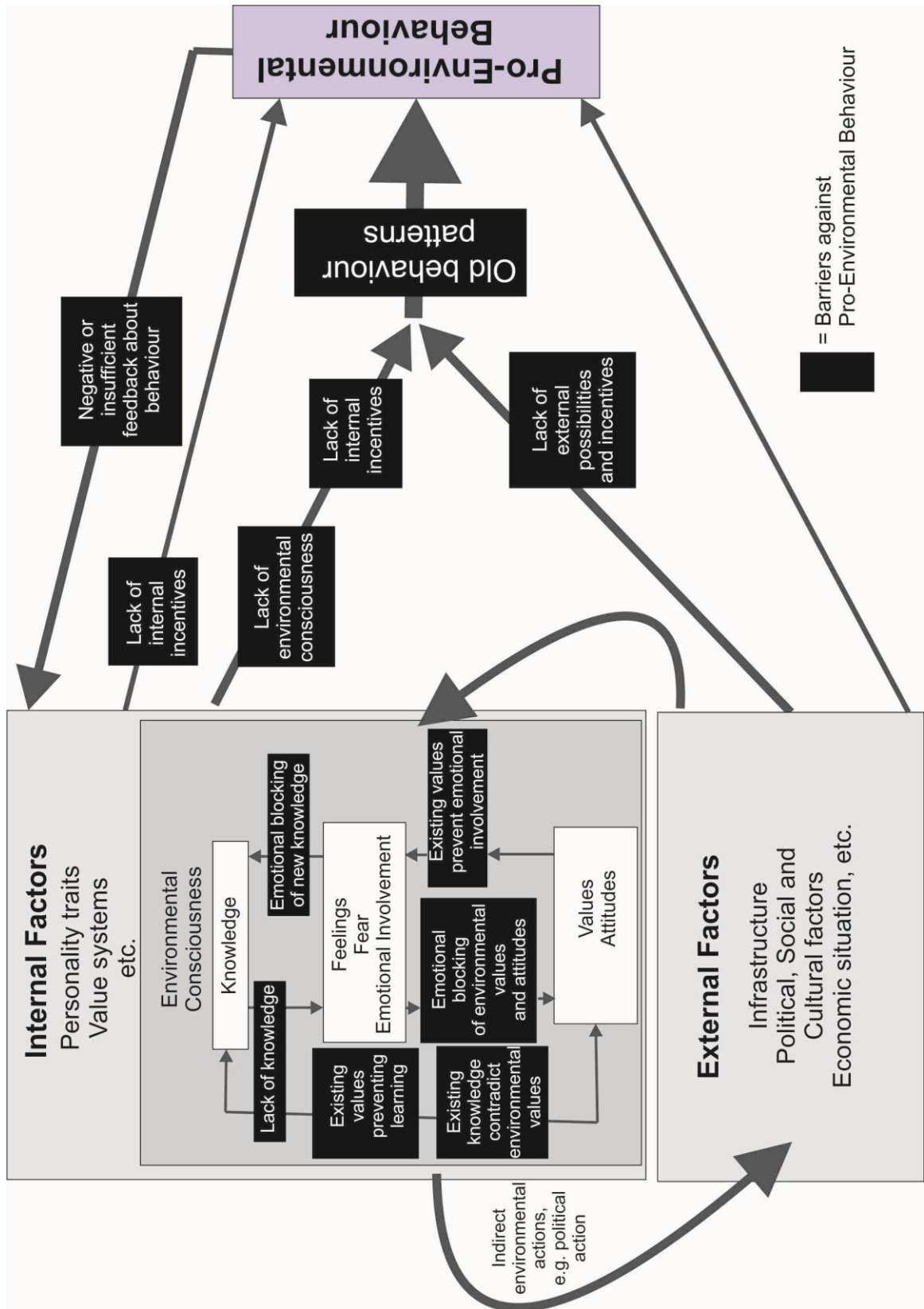


Figure 3.5: Kollmuss and Agyeman's Model of Pro-environmental Behaviour
(Kollmuss & Agyeman, 2002:257)

A number of studies have been done to explain the gap between the possession of environmental knowledge and environmental awareness, and displaying pro-environmental behaviour, however, no definitive explanation has been found for this gap (Kollmuss & Agyeman, 2002:239; Smith, 2008:64).

Smith (2008:68) stressed the fact that the antecedents of behaviour models are necessarily general in nature, and that their utility in understanding the impact of behaviour requests are restricted.

Smith (2008:68) indicates,

“Thus while their examination yields a better understanding of antecedents to pro-environmental behaviour, their utility to understanding the impact of specific behavioural requests are limited, possibly due to the aforementioned failure of general attitudes to predict specific behaviours. A conceptual solution to this dilemma is the idea that, for any given behaviour, individuals are in a state of more or less readiness to perform it. At one extreme, the behaviour may be completely unknown and at the other, may already be performed regularly”.

In addition, Schultz (2011:1081) mentions that efforts in respect of Conservation Education have to include a reason for action, or a motivational element. Potential motivational elements are, for example, self-interest, social responsibility and self-transcendent values. Information coupled with motivation can induce change. For the purpose of this study, the researcher would like to present a model adapted from the one by Kollmuss and Agyeman (2002:257), as depicted in figure 3.5, as a theoretical framework, including potential motivational elements, namely self-interest, social responsibility, and self-transcendent values. Figure 3.6 gives an indication of such a model.

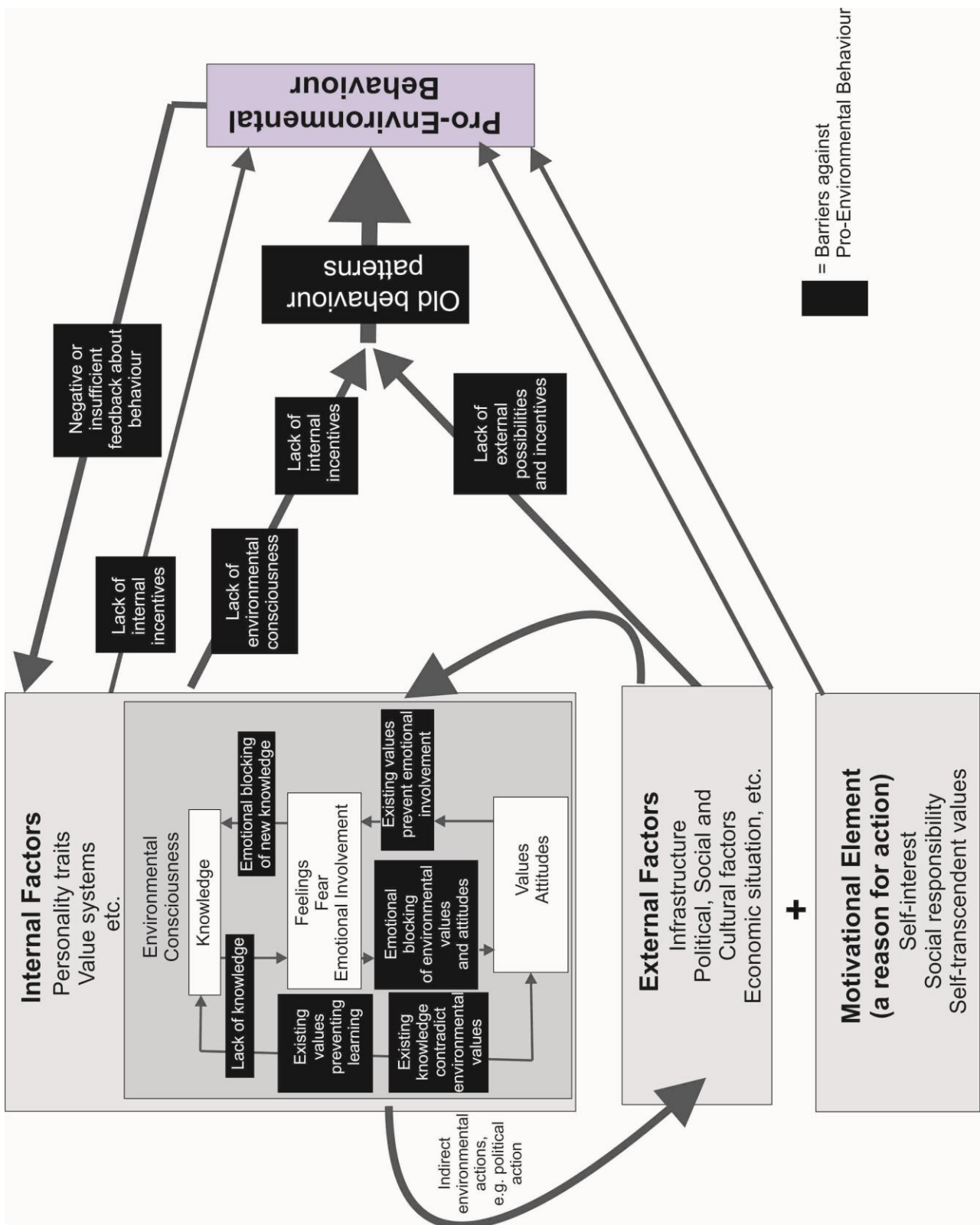


Figure 3.6: A Model of Pro-environmental behaviour, adapted from that of Kollmuss and Agyeman (2002:257)

3.2.3 Learning theories

The Conservation Education programmes that form part of this study involve hands-on learning activities facilitated by a zoo educator. A change in pro-environmental behaviour is envisaged by these programmes by following methodologies that fall within the socio-constructivism and experiential learning perspectives.

Furthermore, the zoo educators assist the learners' learning within a *zone of proximal development*, according to Vygotsky's social development theory. Vygotsky argued that there is a zone of potential assisted learning that can occur above and beyond the autonomous learning potential of a learner. Learning can be assisted by a 'more knowledgeable other', who can provide support and guidance through the learning process (Jensen, 2011:96-97). Jensen (2011:97) furthermore argues that viewing new animals in a zoo has the potential to result in a form of cognitive disequilibrium, as theorized by Jean Piaget. According to Piaget's theory, learning takes place when the learners are exposed to new situations that existing mental maps are not set up to process – thereby leading to cognitive 'disequilibrium'. To re-equalize, the learner must extend his or her existing mental maps. As a result, the learners are confronted with new stimuli and zoo animals they have never seen before. If facilitated effectively by means of interpretation and education, the re-equalising process has the potential to extend the pupils' thinking about animals (Jensen, 2011:97).

Jensen (2011:97) argues that viewing new animals in a zoo has the potential to result in a form of cognitive disequilibrium, as theorised by Piaget. Jensen came to the conclusion that the assimilation of new ideas into a learner's existing mental map (for understanding animals and habitats) can be significantly enhanced through assistance from a *more knowledgeable other*, (in this case the zoo educator).

According to Jensen (2011:96-97),

“This theoretical model of zoo learning places zoo educators in the role of toolmakers, fashioning the most effective concepts and explanations possible and provisioning pupils with these concepts for them to use to leverage themselves into a higher level of learning”.

3.2.3.1 Socio-constructivism

The socio-constructivism perspective regards students as active learners who are responsible for developing their knowledge in a specific social setting. Learning takes place through the learners' experience, knowledge, habits and preferences. This understanding of learning goes back to the work by Piaget in 1954 that described *knowing* as a balance between what is familiar and what is novel. We organize the world by ourselves, and according to our existing knowledge and experiences we 'construct' our own knowledge. The term *cognitive constructivism* designates this perspective, which was developed further by Vygotsky. He emphasized the importance of the social context for learning, and introduced the term *social constructivism* (Stauffacher, Walter, Lang, Wiek & Scholtz, 2006:257).

The *socio-constructivism* learning perspective involves that the learners are being confronted with a problem, and are being given the opportunity to construct their specific views of the situation (Stauffacher et al., 2006:258).

3.2.3.2 The experiential perspective

"Tell me, and I will forget. Show me, and I may remember.

Involve me, and I will understand".

- Confucius -

Experiential learning is a process whereby the learners shape their understanding, expertise and interpersonal skills through affective and cognitive experiences with their bio-physical or social environment. By engaging in these experiences, the learners construct meaning, integrating the cognitive, emotional, and physical aspects of learning (Oxendine, Robinson & Wilson, 2004:1). Dewey's theory, namely 'Experience and Education' (1938) serves as a foundation of experiential learning. Dewey asserts that all human experience is social, and involves contact and communication. Thus, humans are social beings who only exist within a social environment. According to Dewey's Experiential Learning Theory, people live in a world surrounded by other people and things, that are the result of previous human

experiences. These collective experiences construct knowledge as we know it (Roberts, 2003:2).

According to Roberts (2003:7-9), Dewey proclaimed that experience is the foundation for everything in life, and that people learn from their experiences, which allow them to shape their future experiences. He believed that learners should be involved in real-life tasks and challenges which should be based on their abilities and readiness. Upon completion of an experience, the learners have the knowledge and the ability to apply it in different situations. Consequently, they will have created new knowledge and are at different levels of readiness for continually gaining and constructing new knowledge (Roberts, 2003:7-9). Furthermore knowledge is organized by the teacher into logical content pieces. The teacher, (in this case the zoo educator), also facilitates the learners' experience with the content, based on the learners' readiness (Roberts, 2003:2). Experiential learning, as part of Conservation Education, restores the relationship with natural environments, and inspires, soothes, and offers new and unfamiliar stimuli (Comité de Valorisation de la Rivière Beauport. n.d.:2).

In this study the learners were involved in Conservation Education programmes where socio-constructivism learning and experiential learning were applied in hands-on activities, and facilitated by zoo educators.

3.3 The research design

A *research design* is a strategic framework for action that serves as a link between research questions and the carrying out of the research (Durrheim, 2006:34). According to Cresswell, Plano Clark, Gutmann and Hanson (2008:163), it is a procedure for collecting, analysing and reporting research.

3.3.1 The research questions

The aim of this study is to comparatively evaluate the Conservation Education programmes of the National Zoological Gardens of South Africa (NZG), the Uganda Wildlife Education Centre (UWEC), and Zoo Negara, in order to identify a model for an effective zoo Conservation Education programme.

The objectives of the study are

- to evaluate the effectiveness of the Conservation Education programmes of the zoos in the three countries, as indicated above, in increasing the learners' knowledge, attitudes and values about wildlife and wild places;
- to benchmark the Conservation Education programmes of the NZG against those of the other two international zoos;
- to establish criteria for the successful implementation of Conservation Education programmes; and
- to determine whether it is the function of zoos to contribute to biodiversity conservation through Conservation Education.

The quantitative questions in respect of this research study are the following, namely

- How effective are the Conservation Education programmes presented at the zoos in the three countries in increasing the learners' knowledge, attitudes and values about wildlife and wild places?
- How do the Conservation Education programmes of the NZG compare with those of the other two international zoos?

The qualitative research questions are, namely

- How does the Conservation Educational programmes of the NZG compare with those of the other two international zoos?
- What is the purpose of a zoo?
- Is there a justification for the existence of zoos?

In order to answer the above-mentioned research questions, the research design for this study was a combination of comparative and evaluative research.

Evaluative research is primarily concerned with the assessment of the strengths and weaknesses of programmes, policies, personnel, products and organizations in an effort to improve their effectiveness (Miller & Salkind, 2002:8). Evaluative research is involved in making judgements about the value or merit of a programme and the evaluation researcher studies social processes to determine if a programme or project is accomplishing what it is intended to accomplish (Miller & Salkind, 2002:5).

Comparative research is a research methodology in the social sciences with the major aim to detect likenesses and differences between cultures, societies, and institutions (Sasaki, 2004: 8). A study is regarded to be comparative when certain issues or phenomena in two or more countries are investigated with the direct aim of comparing their institutions, cultures, value systems and lifestyles, using the same research instruments to conduct new experiential work. The researcher(s) formulate the problem and by making use of the 'safari' approach, carry out the study in more than one country, using replication of the experimental design (Hantrais, 1995).

3.3.2 Methodology

The *methodology* of a research project is the framework that relates to the entire process of the research, while methods are more specific, and include data-collection and analysis (Creswell & Garrett, 2008:4).

The methods used in this study will be discussed in section 3.3.3.

Both quantitative and qualitative data were implemented in this study in order to provide a better understanding of the research problems (Creswell & Plano Clark, 2007:5). The qualitative research involved making use of interviews and observations, and the quantitative research made use of questionnaires as research instruments.

These research instruments and the justification for their use are discussed in sections 3.3.3 and 3.3.4.

Mixed-methods research, also referred to as *mixed research*, is a combination of at least one qualitative and one quantitative component (Bergman, 2008:1; Creswell & Plano Clark, 2007:5). The mixed-methods research approach is an approach to knowledge that attempts to consider multiple viewpoints, perspectives, positions, and standpoints, including the standpoints of qualitative and quantitative research (Johnson, et al., 2007:113). The reasons for choosing the mixed-methods research methodology were based on the research questions and the purpose of the research (Hall, 2012:4).

By mixing the data sets, the researcher aims to provide a better understanding of the problem, than if either data set had only been used. According to Creswell and Plano Clark (2007:5), it is not enough to simply collect and analyse quantitative and qualitative data; they need to be *mixed* or *merged* in some way, so that together they form a more complete picture of the problem, than if they were used alone.

This merging of the results will be reported on in Chapter 5.

3.3.2.1 The nature of mixed-methods research

Johnson and Onwuegbuzie (2004:17) define *mixed method research* as

“...the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study”.

They do not view mixed methods simply as methods, but more as a methodology that extends from perspectives to interference. According to Creswell (2011:271), different perspectives are incorporated in the definition of Johnson and Onwuegbuzie (2004:17), however, they do not mention any specific philosophy.

Creswell and Plano Clark (2007:5) define *mixed-methods research design* as

“...a research design with philosophical assumptions as well as methods of inquiry. As a methodology, it involves philosophical assumptions that guide the direction of the collection and analysis of data and the mixture of qualitative and quantitative approaches in many phases in the research process. As a method, it focuses on collecting, analysing, and mixing both quantitative and qualitative data in a single study or series of studies. Its central premise is that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone”.

This definition was built on describing an approach using multiple meanings, and had both a philosophical and method orientation (Creswell, 2011:271).

According to Creswell (2011:271), the core characteristics of mixed methods are as follows, namely

“....., the researcher

- collects and analyses persuasively and rigorously both qualitative and quantitative data (based on research questions);
- mixes (or integrates or links) the two forms of data concurrently by combining them (or merging them), or sequentially by having one build on the other, and in a way that gives priority to one or to both;
- uses these procedures in a single study or in multiple phases of a program of study;
- frames these procedures within philosophical worldviews and a theoretical lens; and
- combines the procedures into specific research designs that direct the plan for conducting the study”.

Research approaches continually develop and change in response to the multifaceted, interconnected global societies and their needs in our world, and as such mixed-methods research has evolved together with quantitative and qualitative approaches as a significant instrument for researchers (Creswell & Garrett, 2008:321).

Different concepts have been used in the past to describe mixed-methods research, for example *integrated*, *combined*, *synthesis*, *quantitative* and *qualitative*, *multi-method*, and *multi-methodology* research. However, recent writings refer to the term *mixed methods* (Creswell, 2003:24; Creswell & Garrett, 2008:323).

In spite of its value, conducting mixed-methods research has its challenges. It is time-consuming, and needs more resources to collect and analyse both quantitative and qualitative data. Another challenge is that it complicates the methodology and representation in order to make it clear to the reader. The researcher also has to be competent with both quantitative and qualitative research skills (Creswell & Plano Clark, 2007:10). Concerns whether researchers can use multiple world-views and paradigms in mixed-methods research (Creswell & Garrett, 2008:325), and the quest of finding an appropriate paradigm in order to provide legitimation for the use of mixed methods (Hall, 2012:1) prove to be thought-provoking as well.

The philosophical assumptions on the knowledge claims will be discussed in section 3.3.2.2 below.

Creswell and Garrett (2008:329) are of the opinion that although mixed methods is an emerging approach to research and is still in the debate and discussion-stage of development, it is gaining increased interest worldwide, and is likely to continue to grow over the next few years, especially in education.

3.3.2.2 The philosophical assumptions of the knowledge claims

Setting a knowledge claim means that researchers start a research project with certain assumptions about how and what they will learn during their inquiry. These 'claims' could be called *paradigms* (Creswell, 2003:6). *Paradigms* act as perspectives that provide a rationale for the research, and commit the researcher to particular methods of data-collection, observation and interpretation (Durrheim, 2006:40). Mixed-methods research draws from the strengths and minimizes the weaknesses of both the qualitative and the quantitative approaches in single research studies, and across studies (Johnson & Onwuegbuzie, 2004:14-15). An appropriate paradigm needs to be identified in order to provide legitimation for the use of a mixed-methods

approach comparable to the paradigms that have been widely accepted as justifying the use of quantitative and qualitative methods individually (Hall, 2012:1).

According to Bergman (2008:1), *mixed-methods research* is the combination of at least one qualitative and one quantitative component in a single research project. The distinction between quantitative and qualitative research is, at the most basic level, that quantitative researchers collect data in the form of numbers, and make use of statistics in the analysis of their data, while qualitative researchers collect data in the form of the written and the spoken language, or in the form of observations that are recorded in language, and they analyse the data by identifying and categorizing themes (Durrheim, 2006:47). Qualitative researchers find themselves within an interpretivist paradigm, although they also have realist assumptions about the world and the contextual conditions that shape and embed the perspectives of those they seek to study. Quantitative research is by contrast associated with positivism (Greene, 2005:207; Symonds & Gorard, 2010:123).

These two paradigms are based on two different and competing ways of understanding the world which are related in the way the research data are collected, as well as the perspective of the researcher, namely perspectival versus objective, and discovery versus proof (Maykut & Morehouse, 1994:2-3, in: Durrheim, 2006:3). Both paradigms are legitimate and can provide different perspectives on the same topic (Greene, 2005:207; Symonds & Gorard, 2010:123). However, the challenge is to find a rationale for combining qualitative and quantitative data in the face of apparently incompatible paradigms (Hall, 2012:1-2; Symonds & Gorard, 2010:123). Furthermore, Johnson et al. (2007:15) are of the opinion that mixed-methods research is the third methodological paradigm, along with qualitative and quantitative research. On the whole, mixed-methods research recognizes the significance of traditional quantitative and qualitative research, but then again also offers a powerful third paradigm choice, that often will provide the most informative, complete, balanced, and useful research results (Johnson et al., 2007:15).

Since mixed-methods research is an approach to knowledge that attempts to consider multiple viewpoints, perspectives, positions and standpoints, the main paradigm of mixed research is that of pragmatism (Cameron, 2011:101; Johnson et al., 2007:114).

The basic pragmatic method translated in mixed-methods research is choosing a combination of methods that works best for answering the research questions (Johnson & Onwuegbuzie, 2004:17). Johnson and Onwuegbuzie (2004:17) recommend pragmatism as a philosophy that can help to find a synergy between the conflicting philosophies mixed-methods research is based upon. These researchers also consider pragmatism to be the philosophy that is useful in mixed-methods research, since it offers a central-position philosophy, as well as a practical and outcome-oriented method of inquiry that is based on action (Johnson & Onwuegbuzie, 2004:17).

Pragmatism is a theory that is specifically associated with the American philosophers Charles Pierce (1839-1914), William James (1842-1910) and John Dewey (1859-1952). The core of pragmatism is the pragmatist maxim or method, a rule for clarifying the contents of hypotheses by tracing their practical consequences (Higgs & Smith, 2000:274). The pragmatic maxim is used to determine the meaning of words, concepts, statements, ideas and beliefs and implies that we should “consider what effects, that might conceivably have practical bearings, we conceive the object of our conception to have. Then our conception of these effects is the whole of our conception of the object” (Johnson et al., 2007:17).

In the work of Pierce and James, the most influential application of the pragmatist maxim was to the concept of truth. According to the pragmatist maxim, an ideology is true if it works satisfactory, the meaning of such a proposition is to be found in the practical consequences of accepting it, and that unpractical ideas should be rejected (Higgs & Smith, 2000:274).

The characteristics of pragmatism, important for this study, include the following:

- Pragmatism is not committed to a specific philosophy and reality (Creswell, 2003:13).
- Pragmatism is a middle-ground between philosophical dogmatisms and skepticism (Johnson & Onwuegbuzie, 2004:18).

- Individual researchers have a freedom of choice of approaches to collecting and analyzing data that best answer their research questions (Creswell, 2003:13).
- Pragmatism sees truth as what works at the time, and is not dependent on a strict contrast between the mind and reality, independent of the mind. This allows researchers to use both qualitative and quantitative data in answering the research problem (Creswell, 2003:13).
- Pragmatism recognizes the existence and importance of the natural world, as well as the social and psychological world, including language, culture, human institutions, and subjective thoughts (Johnson & Onwuegbuzie, 2004:18; Creswell, 2003:13).
- Pragmatism views knowledge as being both constructed and based on the reality of the world we experience and live in, and occurs in social, historical, political and other contexts (Johnson & Onwuegbuzie, 2004:18; Creswell, 2003:13).

A weakness of pragmatism as a paradigm for mixed-methods research is that it is often used as a way to get around many traditional philosophical and ethical disputes. Many current philosophers have rejected pragmatism because of its logical, as contrasted to practical inadequacy as a solution to many philosophical disputes (Johnson & Onwuegbuzie, 2004:19). Pragmatism as a research paradigm for mixed-methods research is criticized by Hall (2012:4), who is of the opinion that pragmatism does not enter into the choice of mixed methods, nor justify its use, since the focus of the paradigm limits its application to only a small range of social scientific research, namely that of central importance to the lives and experiences of marginalized groups.

According to Bergman (2008:4), *pragmatism* is difficult to apply as an answer to the incompatibility of paradigms if the differences between qualitative and quantitative methods are considered in detail. He indicates that mixed-methods research cannot claim to bridge the gap between positivism and constructivism, and is unlikely to replace well-designed mono-method designs. However, a mixed-methods design is able to provide an alternative to mono-designs as an answer to specific research questions.

Furthermore Johnson and Onwuegbuzie (2004:23-24) concluded that growth in the mixed-methods pragmatist movement has the potential to reduce some of the problems associated with singular methods, and should be recognized in the social and behavioural sciences as the third major research paradigm. According to Creswell (2003:14), pragmatism "...opens the door to multiple methods, different worldviews, and different assumptions, as well as to different forms of data-collection and analysis in the mixed-methods study". The researcher agrees to pragmatism as position on the knowledge claims derived from this study, based on the methods of data-collection that include qualitative and quantitative approaches, as discussed in the paragraphs above.

3.3.2.3 The mixed-methods strategy

The mixed-methods strategy used for data-collection in this study is that of concurrent triangulation.

According to Bergman (2008:5),

"The triangulation design is a one-phased design in which quantitative and qualitative data are collected and analysed in parallel and then merged together to develop a more complete understanding or to compare different results".

It is selected as the mixed-methods research strategy when two different methods are used in an effort to confirm, cross-validate, or support findings within a single study. Although qualitative methods are used to develop the quantitative research instruments, separate quantitative and qualitative data are collected concurrently to strengthen the weaknesses within one method with the strengths of the other method (Creswell, 2003:24). There is little or no interaction between the two data sets during data-collection (Morse, 1991:120), but it is merged later.

The concurrent triangulation design is illustrated in Figure 3.7 as it appears in the work by Bergman (2008:5).

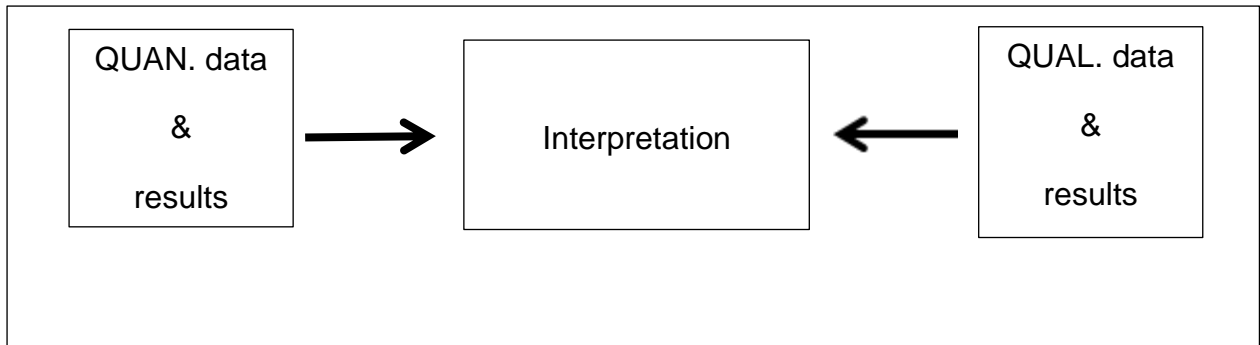


Figure 3.7: The concurrent triangulation design
(Bergman, 2008:5).

The criteria for choosing the concurrent triangulation design are, namely

- the design of the study needed to address the same topic in order to develop a more complete understanding of the main research question;
- the same amount of weight had to be given to both the quantitative and qualitative approaches in order to answer both the quantitative and qualitative research questions;
- the sequence of the implementation of the quantitative and qualitative data-collection had to be simultaneous; and
- the findings of the quantitative and qualitative data will have to be integrated in the interpretation phase.

The figures that display the overall flow of research activities can be helpful for readers to understand the basic procedures used in mixed-methods research. Such visual models show both the quantitative and the qualitative methods, and use arrows to indicate the sequence of the activities in the study (Creswell & Plano Clark, 2007: 166).

Figure 3.8 illustrates the implementation of the mixed-methods strategy for this study. The notation system used in this model was developed by Morse (1991:120-123), and is widely used by researchers making use of mixed-methods studies. *Qualitative* is abbreviated as *qual.* and qualitative as *quan.* Upper-case letters are used to illustrate the main emphasis (e.g., QUAL, QUAN) on that form of data-collection, and lower-

case to imply less emphasis (e.g., qual, quan). A plus (+) sign is used to denote the concurrent collection of quantitative and qualitative data, and an arrow is used to illustrate that one form of data followed another (Morse, 1991:122-123).

In this study, qualitative methods (brainstorming sessions) were used to develop the quantitative instruments (questionnaires). Thereafter, the quantitative and qualitative methods were used in parallel to answer both the quantitative and the qualitative research questions.

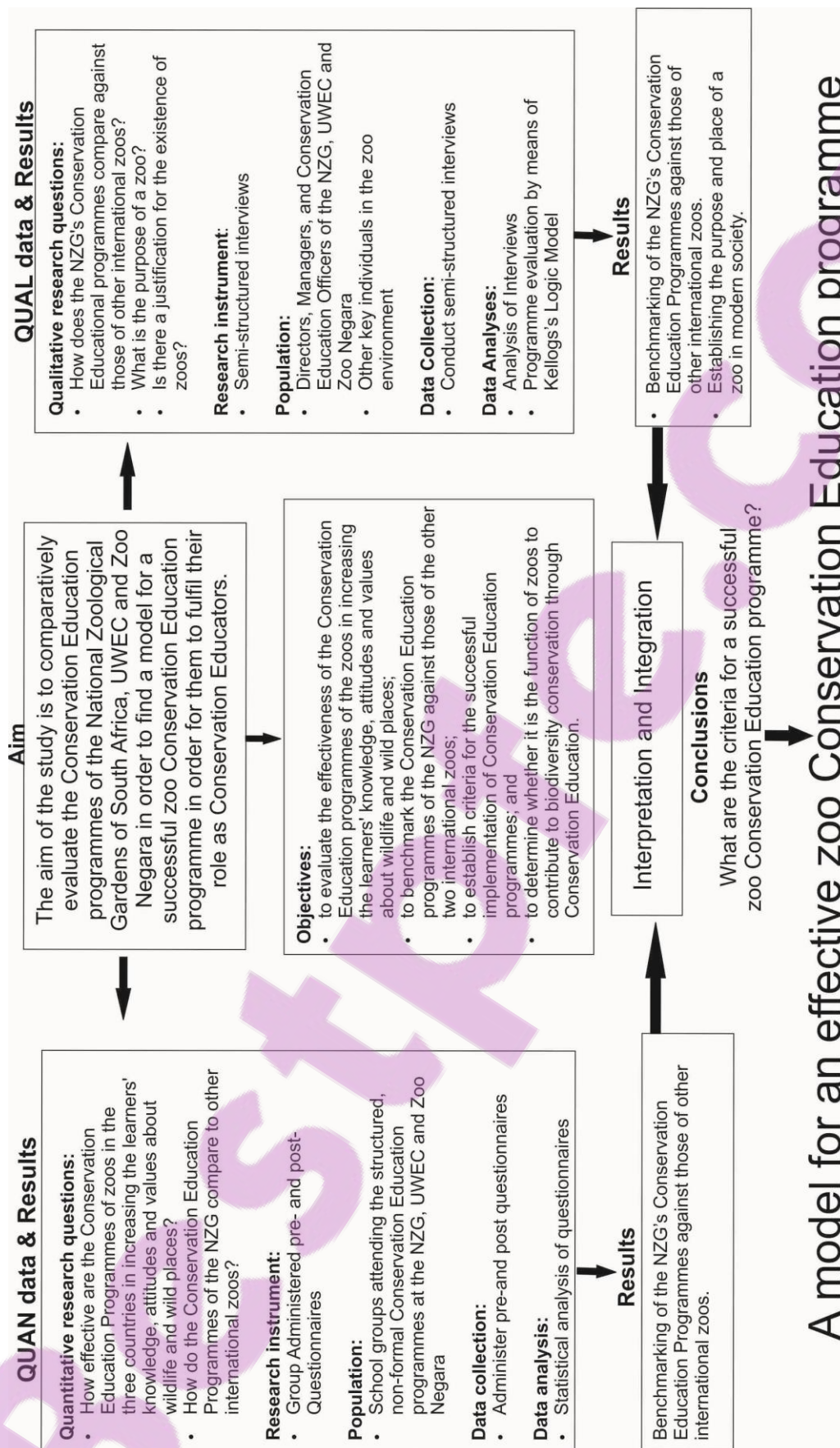


Figure 3.8: The implementation of the mixed-methods strategy

3.3.3 The quantitative method

3.3.3.1 The research technique

By studying a sample of a population, a quantitative or numeric description of the trends, attitudes or opinions of that population can be determined by means of a survey design (Creswell, 2003:153).

Surveys were the research technique that was used to evaluate the zoo Conservation Education programmes.

3.3.3.2 The research instruments

The research instruments that were used in the quantitative part of this mixed-methods research study were group-administered questionnaires.

A questionnaire is a form of structured interviewing (Hofstee, 2006:132), and is composed of a series of pre-set questions that can be self-administered, administered by mail, or asked by interviewers (Berdie et al., 1986:1). A well-designed questionnaire provides a collection of reliable and reasonably valid data in a simple, cheap and apt manner (Le Roux, 2005:8).

Questionnaires have to be designed in accordance with the specific objectives in mind (Berdie et al., 1986:5). In order to determine the questions, a clear understanding of the purpose of the research is important if you are to limit the questions to the pertinent issues, and also to prevent the accumulation of unrelated information (Le Roux, 2005:187).

Lehnhardt (2010:4) suggested that in order to evaluate the Zoo Conservation Education programmes by making use of the questionnaire as the research instrument, the different objectives of the programmes must be used to write specific evaluation questions that will demonstrate whether these objectives have been achieved.

In order to formulate the questions, brainstorming sessions were held with the education officers to identify the key messages that the Conservation Education

programmes strived to communicate to the learners attending these programmes with regard to cognitive and affective messages, namely attitudes and values. The programmes that were evaluated at the different zoos were selected based on similar key messages in order to compare these programmes. The key messages of the Conservation Education programmes of the different zoos that participated in the study are indicated in Table 3.1.

Table 3.1: Key messages of the Conservation Education Programmes

Zoo	Key Messages
The National Zoological Gardens of South Africa (NZG)	<ul style="list-style-type: none"> • South Africa has a wonderful variety of animals and plants. • Some of South Africa's animals are threatened by <ul style="list-style-type: none"> ○ poaching ○ exotic pet trade ○ 'bush meat' trade ○ deforestation ○ climate change • You can play a very important role in protecting the animals and their habitat.
The Uganda Wildlife Education Centre (UWEC)	<ul style="list-style-type: none"> • Uganda has a wonderful variety of animals and plants. • Some of Uganda's animals are threatened by <ul style="list-style-type: none"> ○ poaching ○ exotic pet trade ○ the bush-meat trade ○ deforestation ○ climate change • You can play a very important role in protecting the animals and their habitat.
Zoo Negara	<ul style="list-style-type: none"> • Malaysia has a wonderful variety of animals and plants. • Some of Malaysia's animals are threatened by <ul style="list-style-type: none"> ○ deforestation ○ illegal pet trade ○ poaching • You can play a very important role in protecting the animals.

Table 3.2 indicates the zoos that participated in the study, their countries, the Conservation Education programmes that were evaluated, and the age groups of the learners that participated in the study. The programmes that were evaluated at the different zoos had similar key messages. The learners who participated in the study were from the same school grades. Two questionnaires were designed, namely one for Grade 7 (Senior Phase) and one for Grade 10 (FET Phase) in the South African context. The learners from countries other than South Africa who participated in the study were from school levels equivalent to these grades in South Africa

Table 3.2: The zoos that formed part of the study

Zoo	The National Zoological Gardens of South Africa (the NZG)	The Uganda Wildlife Education Centre (the UWEC)	Zoo Negara
City	Pretoria	Entebbe	Kuala Lumpur
Country	South Africa	Uganda	Malaysia
Conservation Education Programme	Endangered-animal Guided Tour	On-site Guided Tour	Discovery Programme
Age Group	Grade 7	Higher Primary Level	Primary Level 2
	Grade 10	Secondary Ordinary Level	Grade 10

The following criteria were taken into consideration in formulating the questions and the statements:

- The format should be simple, and the questionnaire should not take long to complete. The format influences whether or not the respondent will take the time to complete the questionnaire (Le Roux, 2005:188). A total of six

questions were asked for the primary school learners in Grade 7, and ten statements were formulated for the learners in Grade 10.

- The questions were designed according to the cognitive level of the learners. The learners in Grade 7 and the equivalent were asked 'true or false' questions in order to establish the learners' knowledge, attitudes and values in respect of the environment before the commencement of the programme, taking into consideration that many learners in this phase, especially those from the rural communities, often have problems with writing skills. The Likert-scale was used to establish the learners' knowledge, attitudes and values in respect of the environment before the programme commenced for learners in Grade 10 and the equivalent.
- The questions should be worded as simply as possible (Berdie et al., 1986:31). Berdie et al. (1986:31) also recommended that the researcher uses language that is familiar and appropriate to the population for whom the questions are intended. Brainstorming sessions were held with the education officers at the different zoos to ensure that the language used in the questionnaires was appropriate. This was also tested during the pilot study, and changes were made to the questionnaires, as described in section 3.3.3.3.
- The layout should be simple and reduce confusion, and should help to elicit valid responses (Le Roux, 2005:188). A large font size was used in the Grade 7 questionnaire.
- The same questionnaires were completed by the same learners before and after the programme to evaluate the impact of the programme.
- As far as possible the questionnaires remained the same for the different zoos so that what the question was meant to test remained the same, although the questions may differ according to the different programmes and the zoos. The reason for this was that the animal collections, as well as the relevant conservation issues, for example the poaching of rhinoceros, differ in the different countries. However, the meaning of the question and what it tested, namely a change in knowledge, attitude or value, remained the same.
- The questions had to be translated by the education officer into the first language of the Grade 7 learners if their first language was not English, or if English was not the medium of their receiving instruction.

3.3.3.3 The pilot study

A *pilot investigation* is a small-scale trial run before the main investigation, intended to assess the adequacy of the research instruments (Wilson & Sapsford, 2006:103). The questionnaire should be tested by means of a pilot study during which it is tried out on a number of participants who are similar to those who will form part of the actual investigation. . Any problem with the wording of the draft questionnaire would show up at this stage and can be corrected before the real investigation starts (Le Roux, 2005:188; McNeill & Chapman, 2005:45). The adjustments as established during the pilot study are made prior to launching the questionnaire to the research population (Le Roux, 2005:188).

The aim of the pilot study is to establish whether

- the respondents understand the questions as they were phrased;
- the order of the questions is acceptable;
- appropriate language is used;
- the time it takes to complete the questionnaire is acceptable (Wilson & Sapsford, 2006: 103).

The questionnaires were piloted at UWEC. Some of the questions were changed after the pilot study. These changes are discussed in the paragraphs that follow below.

Primary Schools:

'True' and 'false' questions were used to establish the learners' knowledge, attitudes and values in connection with wild animals and the environment before and after the learners followed the Conservation Education programmes. The learners had to respond by choosing between 'true' or 'false' questions by making a tick in the appropriate block on the questionnaire.

Secondary Schools:

Likert-type scales were used to establish the learners' knowledge, attitudes and values in respect of wild animals and the environment before and after the learners followed the Conservation Education Programmes. The Likert-type scales (Likert, 1932) mean that the respondents state their levels of agreement (strongly disagree – strongly agree) with a number of statements. The learners could choose between whether they “strongly agree”, “agree”, were “not sure”, “disagree” or “strongly disagree” with the different statements (Collins, Du Plooy, Grobbelaar, Puttergill, Terre'blanche, Van Eeden, Van Rensburg & Wigston, 2000:189). The questions were phrased in such a way that “agree” or “strongly agree” indicated a correct answer with regard to knowledge, positive attitudes and values towards the environment, and “disagree” or “strongly disagree” indicated an incorrect answer, or a negative attitude towards the environment.

Primary Schools:

The following statements were developed to evaluate a change in knowledge:

- Chimpanzees are endangered animals. Correct answer: True.
- Rhinoceroses are found in the wild in Uganda. Correct answer: False.
- Tortoises make good pets. Correct answer: False.

After the pilot study, these statements were changed to the following, namely:

- Chimpanzees are threatened animals. Correct answer: Yes.
- Rhinoceroses are found in the wild in Uganda. Correct answer: No.
- Wild animals make good pets. Correct answer: No.

The following questions were developed to evaluate a change in attitude and values, namely

- It is good to eat bush-meat.
- I want to help to protect animals.

After the pilot study, these statements were changed as follows:

- It is good to eat the meat of threatened wild animals. Correct answer: No.
- I want to help to protect wild animals. Correct answer: Yes.
- Littering harms the ecosystem. Correct answer: Yes.

The reasoning behind these changes was as follows:

- The word 'endangered' was replaced with 'threatened' in the statement "Chimpanzees are endangered animals", after it became clear that some learners confused 'endangered' with 'dangerous'.
- The statement "Tortoises make good pets" was replaced with "Wild animals make good pets", since the illegal pet industry is not confined to only tortoises, but also include a wide variety of wild animals.
- The statement "It is good to eat bush-meat" was changed to "It is good to eat the meat of threatened animals" since 'bush meat' includes a wide variety of animals of which not all were endangered.
- One more statement, namely "Littering harms the ecosystem" was added to the statements evaluating values and attitudes in order to obtain a more reliable result.
- The word 'true' was replaced with 'yes', and 'false' with 'no', since the learners understood these words better.

Secondary Schools:

The following statements were developed to evaluate a change in knowledge in the Secondary Ordinary Level questionnaire:

- Chimpanzees are endangered due to poaching, the consumption of bush-meat, pet trade and the destruction of their habitat.
- A chimpanzee's DNA is 98,8% similar to a human's DNA.
- The pet trade is a threat to the survival of tortoises and terrapins.
- Rhinoceros are poached for their horns.
- Rhinoceros are not found in the wild in Uganda anymore.

After the pilot study, the statements were changed as follows:

- Chimpanzees are endangered due to poaching, the consumption of 'bush meat', pet trade and habitat destruction.
- A chimpanzee's DNA is about 98 % similar to a human's DNA.
- The pet trade is a threat to the survival of tortoises and terrapins.
- Rhinoceroses are poached for their horns.
- Rhinoceroses are not found in the wild in Uganda anymore.

The reasoning for these change were as follows:

- The statement "A chimpanzee's DNA is 98,8% similar to a human's DNA" in order to read "A chimpanzee's DNA is about 98 % similar to a human's DNA." The reason for this was that some learners indicated that the statement is not correct since a chimpanzee's DNA is 98,5 % similar to a human's DNA.

The following questions were developed to evaluate a change in attitudes and values:

- Consuming the meat of endangered wild animals is wrong.
- I think we must accept the responsibility for the destruction of the habitats of animals.
- I can play a role in conserving chimpanzees.
- I believe that all living creatures are important.
- I want to get involved in projects to protect animals and their habitats.

These statements were not changed again after the pilot study.

3.3.3.4 Validity and reliability

A *reliable* questionnaire is one which consists of reliable items, meaning that it reliably delivers the same meaning to all the respondents in the target population (Berdie et al., 1986:3). If a method of collecting evidence is reliable, it means that if anybody else uses this method, or the same person uses it at another time, they would come up with the same results. The research could therefore be repeated, and the same results would be obtained ((McNeill & Chapman, 2005:9).

A *valid* questionnaire is one that consists of valid items, meaning it gathers accurate, relevant data. A questionnaire item cannot be valid unless it is also reliable (Berdie et al., 1986:3). Validity and reliability measuring-instruments lead to meaningful interpretations of the data (Creswell, 2003:153).

In this study *reliability* was ensured as follows:

- The questionnaires involved minimal interaction with the researcher, and therefore there was less opportunity for subjective bias (McNeill & Chapman, 2005:44).
- Care was taken not to influence the participants when the questions were translated into their native language.
- Care was taken that the layout of the questionnaire did not influence or encourage a particular response, and that it was not confusing to the participant.

Validity refers to whether the data collected are a true picture of what is being studied (McNeill & Chapman, 2005:9).

In this study validity was ensured in the following ways:

- Key individuals were identified with whom brainstorming sessions were held in order to develop the questionnaire and to standardise it between the different zoos, for example, the education manager and the education officers.

- Care was taken that the interviewer's values, attitudes and opinions did not influence the respondent's answers, especially through the interviewer's facial expression or tone of voice. One must also take into consideration the fact that a questionnaire item that is reliable and valid for one group of people is often not so for those in another group, who has different experiences, levels of knowledge, or world-views (Berdie et al., 1986:3).

3.3.3.5 The standardisation of the research instruments

The standardisation of the measuring instrument, namely the questionnaire, was effected after brainstorming sessions with the Conservation Education staff at the different zoos in order to ensure that the statements in the questionnaires were relevant to the objectives of the programmes that were being evaluated, that they were relevant conservation issues in the different countries, as well as to the animal collection at the different zoos.

The questionnaires were standardised as follows:

Primary Schools:

The following questions were developed to evaluate a change in knowledge:

The UWEC:

1. Chimpanzees are threatened animals. Correct answer: Yes
2. Rhinoceroses are found in the wild in Uganda. Correct answer: No
3. Wild animals make good pets. Correct answer: No

The NZG:

1. Chimpanzees are threatened animals. Correct answer: Yes
2. Rhinoceroses are poached for their horns. Correct answer: Yes
3. Wild animals make good pets. Correct answer: No

Zoo Negara:

1. Asian elephants are threatened animals. Correct answer: Yes
2. The Milky stork is found in the wild in Malaysia. Correct answer: No
3. Wild animals make good pets. Correct answer: No

The following questions were developed to evaluate a change in attitude and values:

The UWEC:

4. It is good to eat the meat of threatened wild animals. Correct answer: No
5. I want to help to protect wild animals. Correct answer: Yes
6. Littering harms the ecosystem. Correct answer: Yes

The NZG:

4. It is good to eat the meat of threatened wild animals. Correct answer: No
5. I want to help to protect wild animals. Correct answer: Yes
6. Littering harms the ecosystem. Correct answer: Yes

Zoo Negara:

4. It is good to eat the meat of threatened wild animals. Correct answer: No
5. I want to help to protect wild animals. Correct answer: Yes
6. Littering harms the ecosystem. Correct answer: Yes

Clarification of the statements used at the different zoos:

- The statement “Chimpanzees are threatened animals” that was used at the UWEC and the NZG was changed to “Asian elephants are threatened animals” for Zoo Negara, according to the focus of the different Conservation Education programmes at the different zoos.
- The statement “Rhinoceroses are found in the wild in Uganda” that was used at the UWEC was changed to “Rhinoceroses are poached for their horns” for the NZG and “The Milky stork is found in the wild in Malaysia” for Zoo Negara, according to the focus of the different Conservation Education programmes at the different zoos.

Secondary Schools:

The following questions were developed to evaluate a change in knowledge:

The UWEC:

1. Chimpanzees are endangered due to being poached, the consumption of 'bush meat', the pet trade and habitat destruction.
2. A chimpanzee's DNA is about 98 % similar to a human's DNA.
3. The pet trade is a threat to the survival of tortoises and terrapins.
4. Rhinoceroses are poached for their horns.
5. Rhinoceroses are not found in the wild in Uganda anymore.

The NZG:

1. Chimpanzees are endangered due to being poached, the consumption of 'bush meat', the pet trade and habitat destruction.
2. A chimpanzee's DNA is about 98 % similar to a human's DNA.
3. The pet trade is a threat to the survival of tortoises and terrapins.
4. Rhinoceroses are poached for their horns.
5. Rhinoceroses' horns have no medicinal value.

Zoo Negara:

1. Orang-utans are endangered due to being poached, the consumption of 'bush meat', the pet trade and habitat destruction.
2. A chimpanzee's DNA is about 98 % similar to a human's DNA.
3. The pet trade is a threat to the survival of tortoises and terrapins.
4. The Malayan tigers are poached for their meat, bones and skin.
5. The Milky stork is not found in the wild in Malaysia anymore.

The following questions were developed to evaluate a change in attitude and values:

The UWEC:

6. Consuming the meat of endangered wild animals is wrong.
7. I think we have to accept the responsibility for the destruction of the habitats of animals.
8. I can play a role in conserving chimpanzees.

9. I believe that all living creatures are important.
10. I would like to get involved in projects to protect animals and their habitats.

The NZG:

6. Consuming the meat of endangered wild animals is wrong.
7. I think we have to accept the responsibility for the destruction of the habitats of animals.
8. I can play a role in conserving rhinoceroses.
9. I believe that all living creatures are important.
10. I would like to get involved in projects to protect animals and their habitats.

Zoo Negara:

6. Consuming the meat of endangered wild animals is wrong.
7. I think we have to accept the responsibility for the destruction of the habitats of animals.
8. I can play a role in conserving the Malayan tigers.
9. I believe that all living creatures are important.
10. I would like to get involved in projects to protect animals and their habitats.

Clarification of the statements used at the different zoos:

- The statement “Chimpanzees are endangered due to being poached, the consumption of ‘bush meat’, pet trade and the destruction of the habitat” that was used at the UWEC and the NZG was changed to “Orang-utans are endangered due to being poached, the consumption of bush-meat, pet trade and the destruction of the habitat” for Zoo Negara, according to the focus of the different Conservation Education programmes at the different zoos.
- The statement “Rhinoceroses are not found in the wild in Uganda anymore” that was used at the UWEC was replaced with “Rhinoceroses’ horns have no medicinal value” for the NZG, and “The Milky stork is not found in the wild in Malaysia anymore” according to the relevance of these issues in the different countries.

- The statement “Rhinoceroses are poached for their horns” that was used at the UWEC and the NZG, was changed to “The Malayan tigers are poached for their meat, bones and skin” for Zoo Negara, according to the relevance of the issues in the different countries.
- The statement “I can play a role in conserving chimpanzees” that was used at the UWEC was changed to “I can play a role in conserving rhinoceroses” for the NZG, and “I can play a role in conserving the Malayan tigers” for Zoo Negara, since the programmes at the different zoos focused on the conservation of the different animals, as indicated by these statements, as well as the relevant conservation issues in the different countries at the time of the evaluation process.

The questionnaires are attached as Appendices A, B, C, D, E, and F as follows:

Appendix A –The Primary School Questionnaire implemented at UWEC.

Appendix B –The Secondary School Questionnaire, implemented at UWEC.

Appendix C –The Primary School Questionnaire, implemented at NZG.

Appendix D –The Secondary School Questionnaire, implemented at NZG.

Appendix E –The Primary School Questionnaire, implemented at Zoo Negara.

Appendix F – The Secondary School Questionnaire, implemented at Zoo Negara.

3.3.3.6 The population and the sample

According to Berdie et al. (1986:11), there are three good reasons for using sampling techniques when conducting surveys with large populations, namely it saves time, it saves money, and the quality of the data is usually better (Berdie et al., 1986:11). From the sample results the researcher generalizes about the population. The basic intent of an experiment is, however, to test the impact of the treatment or of an intervention, in this case the Conservation Education programme (Cresswell, 2003:153).

In this study a non-probability quota sampling method was used, where each segment of the population, namely the learners visiting the different zoos, would be represented. According to Durrheim and Painter (2006:139),

“Non-probability sampling refers to any kind of sampling where the selection of elements is not determined by the statistical principle of randomness. In many situations, these non-probability samples are more than adequate for research purposes. Most experimental studies use small non-representative samples to explore physical or mental processes that are considered to be universal”.

The results will not be generalised to the population and the results will hold only for the sampling groups. In an attempt to improve the representation, three schools per age category were selected, and the representation of urban and rural schools was also ensured. The population consisted of learners visiting the NZG, the UWEC and Zoo Negara.

The schools were chosen from those whose learners attended the zoos during the specific time of the year that corresponds with a time period that many schools visit the zoo, and which was convenient for the researcher to visit the particular zoo. Both rural and urban schools were chosen. All the learners from a school group were included in the sample. Three school groups in each of the grades were included in the study at each of the three zoos.

3.3.3.7 Analysis of the quantitative data

This research is to be conducted by using a validated survey instrument, namely a questionnaire. The primary school groups were asked 6 ‘true’ or ‘false’ questions, and the secondary school respondents were asked 10 questions on a 5 point Likert-scale.

Item analysis is usually done to assess the reliability of the different dimensions or constructs in the questionnaire via Cronbach’s Alpha values (Multon & Coleman, 2010:159). The questions, however, didn’t group meaningfully in constructs. It would make more sense to analyse the questions individually, since differences in the importance of certain questions also existed for the different groups.

The McNemar test was used to determine whether there is an association between two categorical variables in a 2x2 classification table where the same respondents answered both pre- and post-questions.

Morrison (2010:780) indicates that,

“McNemar's test, also known as a test of correlated proportions, is a non-parametric test used with dichotomous nominal or ordinal data to determine whether two sample proportions based on the same individuals are equal. McNemar's test is used in many fields, including the behavioral and biomedical sciences. In short, it is a test of symmetry between two related samples based on the chi-square distribution with 1 degree of freedom (df). McNemar's test is unique in that it is the only test that can be used when one or both conditions being studied are measured using the nominal scale. It is often used in before-after studies, in which the same individuals are measured at two times, a pre-test and a post-test, for example.”

A standard Chi-square test would be inappropriate, because it assumes that the groups are independent. Instead, McNemar's test has to be used, although this test can only be used when there are two measurements of a dichotomous variable. The 2x2 contingency table used for McNemar's test bears a superficial resemblance to those used for 'normal' Chi-square tests, but it is different in structure (Morrison, 2010:780-783).

The results obtained from the quantitative data will be illustrated by means of tables and figures, and then discussed in Chapter 4 section 4.2.4.

3.3.4 The qualitative method

3.3.4.1 The research technique

In order to answer the qualitative research questions, in-person semi-structured interviews were conducted at the three different zoos, namely the NZG, the UWEC and Zoo Negara.

Semi-structured interviews allow for digression from a set format, either in the questions or the answers, depending on the circumstances (Hofstee, 2006:132). The researcher worked through a series of topics. The questions are a combination of open-ended and closed-ended questions (McNeill & Chapman, 2005:56; Kelly, 2006:298). The aim with the semi-structured interviews was to obtain a first-person account in the interviewee's own words (Packer, 2011:43).

A semi-structured interview does not limit the respondents to a set of pre-determined questions. This kind of interview is used to understand how interventions work, and how they may be improved - in this case the Conservation Education programmes of the three different zoos. Semi-structured interviews also allow the respondents to raise and discuss issues that may not have been considered beforehand (Kelly, 2006:298).

3.3.4.2 The research instruments

The pre-determined interview questions for the semi-structured interviews are attached as follows:

Appendix G – The interview questions. Position: Executive/Managing Director.

Appendix H – The interview questions. Position: Education Manager.

Appendix I – The interview questions. Position: Zoo Educator.

Appendix J – The interview questions. Other key individuals in the zoo/conservation environment.

3.3.4.3 Validity and reliability

Qualitative research can be evaluated according to its credibility (Van der Riet & Durrheim, 2006:81). The credibility of qualitative research is established while the research is being undertaken. The researcher continually looks for discrepant evidence to the hypotheses he or she is developing as a means of producing a rich and creditable account. One way of doing this is by making use of triangulation (Van der Riet & Durrheim, 2006:81). *Triangulation* entails collecting material in as many

different ways as possible and from many diverse sources (Kelly, 2006:287). The interviews were conducted with staff members holding different positions at the different zoos. *Triangulation* involves analysing data in different ways, for example, both quantitatively and qualitatively (Kelly, 2006:287). Since the methodology used in this study is that of mixed methods, it is envisaged that the reliability of the qualitative part of the design will be ensured.

Validity refers to whether the data collected are a true picture of what is being studied (McNeill & Chapman, 2005:9). Care was taken not to lead the interviewees during the interviews. Accurate records were kept of the interviews (Hofstee, 2006:136).

3.3.4.4 The standardisation of the research instruments

The basic interview questions were pre-determined in order to collect the required information. All the interviewees were asked the same questions.

3.3.4.5 The population and the sample

Critical case sampling was used, since the researcher was looking for data that are particularly information-rich. *Critical case sampling* is the process of selecting a small number of important cases that are likely to yield the most information and have the greatest impact on the development of the knowledge (Kelly, 2006:290).

Key individuals were identified with whom individual interviews were to be conducted, as follows:

- the Executive/Managing Director of the zoo,
- the Education Manager,
- zoo educator(s),
- other key individuals in the zoo/conservation environment, such as the Executive Director of African Association Of Zoos And Aquaria (PAAZAAB), the Executive Director of the Two Oceans Aquarium, the Managing Director of the Johannesburg Zoo, and the previous Managing Director of the NZG.

3.3.4.6 Analysis of the qualitative data

(a) Interpretive analysis

The interviews were recorded. The advantages of recordings include allowing the researcher to keep a full record of the interviews without being distracted by detailed note-keeping (Kelly, 2006:298). The step after conducting the interviews is to transcribe and analyse them (Parker, 2011:57). It is important to transcribe everything, rather than to try to decide which data are relevant. The meaning of what is being said in an interview can usually be interpreted only in the context of the sentences which surround it and the conversation as a whole (Kelly, 2006:302; Parker, 2011:57).

The method of interpretive analysis was used to analyse the qualitative data.

The purpose of interpretive analysis is

“to provide a thorough description of the characteristics, processes, transactions, and contexts that constitute the phenomenon being studied, couched in language not alien to the phenomenon, as well as an account of the researcher’s roll in constructing this description” (Terre’blanche, Durrheim & Kelly, 2006:321).

An immersion style was used where the analyst became familiar with the phenomena, reflected on it and then interpreted it (Terre’blanche et al., 2006:322).

The steps in interpretive analysis are as follows:

Step 1: Familiarisation and immersion. The analyst should know his/her data well enough to know more or less what kinds of things can be found where, as well as what kinds of interpretations are likely to be supported by die data, and what are not.

Step 2: Inducing themes. *Induction* means inferring general rules or classes from specific instances in terms of processes, functions, tensions and contradictions.

Step 3: Coding. *Coding* means the breaking-down of the data in analytically-relevant ways. This entails marking different sections of the data as being instances of or relevant to one or more of the themes. In coding, the body of data is broken down into labelled, meaningful pieces, with a view to later clustering the coded material together under the code heading, and further analysing it as a cluster, and in relation to other clusters.

Step 4: Elaboration. Themes are explored more closely with the purpose of capturing the finer nuances of meaning not captured by means of the original coding system.

Step 5. Interpretation and checking. This is a written account of the phenomenon, using thematic categories from the analysis as sub-headings that have to be checked in order to identify the weak points (Terre'blanche et al., 2006: 322-326; Parker, 2011:57-78).

(b) The Logic Model

The qualitative data collected by means of the individual interviews were used to determine the best practices and/or weaknesses in the Conservation Education programmes at the three zoos by means of a logic model. A *logic model* is a systematic and visual way to present the relationships between the resources used to operate a programme, the activities included in the programme, and the expected outcomes (W.K. Kellogg Foundation, 2004:1). It is a framework that can be put to good use as a tool to evaluate education programmes (Peter, 2013:12; McCawley, 2002:1).

According to Dierking (2008:27), a *logic model* is a process which can assist in describing the focus or topic of, for example, an education programme, in presenting the planned activities, and in detailing the anticipated outcomes and measures that will be used to assess whether the outcomes and impacts have been accomplished. Thus, a logic model can be put to good use in evaluating and monitoring educational programmes. A *programme logic model* is defined as a picture of how your organization does its work – the theory and assumptions underlying the programme. The model provides a road-map of how the programme works and of how the outcomes are achieved. It links both short- and long-term outcomes with programme

activities and the theoretical assumptions/principles of the programme. A *logic model* is a systematic and visual way to present the relationships among the resources or inputs you have to operate your program, the planned activities and the intended results. (W.K. Kellogg Foundation, 2004:35). It links the problem to the intervention (inputs and outputs), and the impact (outcome) (McCauley 2002:2).

A representation of the logic model used in this study is depicted in Figure 3.8. The different components in the diagram are defined below, namely

- a. The *problem or situation* communicates the relevance of the programme.
- b. *Resources or inputs* include the human, financial, organizational and community resources a programme has available to direct towards the programme.
- c. The *programme activities* are what the program does with the resources, and include processes, tools, events, technology and actions that are intentionally part of the programme to bring about the intended results, which include all of the programmes' desired results, namely outputs, outcomes and impact.
- d. *Outputs* are the direct products of the programme activities, and may include types, levels and targets of services to be delivered by the programme.
- e. *Outcomes* are the specific changes in the participants' behaviour, knowledge, skills, status and level of functioning. Short-term outcomes should be attainable within one to three years, while longer-term outcomes should be achievable within a four to six-year time-frame. The logical progression from short-term to long-term outcomes should be reflected in impact occurring within seven to ten years.
- f. *Impact* is the fundamental intended or unintended change occurring in organizations, communities or systems as a result of programme activities within seven to ten years (W.K. Kellogg Foundation, 2004:2; McCawley, 2002:2).

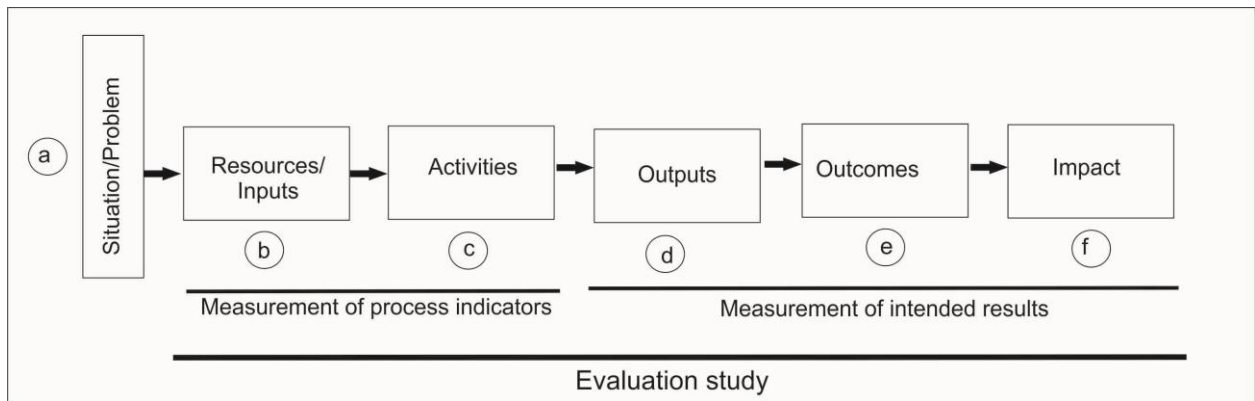


Figure 3.9 The Logic Model as a programme-evaluation tool

(Adapted from the W.K. Kellogg Foundation, 2004:1; and McCawley 2002:2)

For the purpose of programme-evaluation a logic model presents programme information and progress towards the goals (W.K. Kellogg Foundation, 2004:5). A logic model can be used to develop meaningful evaluation questions from a variety of programme vantage points, namely context, implementation, and results – including outputs, outcomes and impact.

- *Context* is how the programme functions within the economic, social, and political environment of its community, and addresses questions that explore issues of programme relationships and capacity. These kinds of evaluation questions can help to explain some of the strengths and weakness of the programmes, as well as the effect of unanticipated and external influences on it (W.K. Kellogg Foundation, 2004:36).
- *Implementation* assesses the extent to which activities were executed as planned, since a programme’s ability to deliver its desired results depends on whether the activities result in the quality and the quantity of the outputs specified (W.K. Kellogg Foundation, 2004:36).
- *Outcomes* determine the extent to which progress is being made toward the desired changes in the individuals, organizations, communities, or the system. Outcome-questions seek to document the changes that occur in the community as a result of the programme (W.K. Kellogg Foundation, 2004:37).

The results obtained from the qualitative data will be represented and discussed in Chapter 4 section 4.3.

3.4 Delineation and limitations

Delineations limit the scope of your work. They describe the boundaries that a researcher has set for a study (Hofstee, 2010:87).

The delineations of this study are indicated below

- This study focused on structured, non-formal Conservation Education programmes at informal institutions, namely zoos, and not on free-choice learning. *Free-choice learning* is defined by Falk, et al.(2009: 39) as learning that takes place in Environmental Education settings when the learning is largely under the choice and control of the learners, and where they do not participate in structured programmes. The aim of this study is to identify a model for Conservation Education structured programmes.
- Identical programmes with similar outcomes were identified at the different zoos in order to compare these programmes. Therefore, not all the programmes offered at the zoos were evaluated in this study.
- The population consisted of learners in the age group 11 to 12 years (Intermediate and Senior Phase) and 15 to 16 years (FET Phase). Younger learners in the Foundation Phase and the Intermediate Phase were not included since these learners often do not have the writing and reading skills to complete questionnaires, and/or to understand English.

Limitations are the shortcomings, conditions or influences that cannot be controlled by the researcher and that place restrictions on the methodology and conclusions (Hofstee, 2010:119).

The limitations of this study were the following, namely

- The population for the quantitative part of the study consisted of learners visiting the NZG and the UWEC zoos and Zoo Negara. The school groups

that participated in the study were chosen from those that attended the zoo at a specific time of the year that corresponds with a time period that many schools visit the zoo, and which was convenient for the researcher.

- All the learners from a school group were included in the sample. This was done to ensure that the learners completed a pre-visit as well as a post-visit questionnaire. During the pilot study it was found that the learners tended to 'disappear' when a random selection was done. Three school groups in each of the two age groups were included in the study at each of the three different zoos.
- Convenience sampling as a non-probability quota sampling method was used in this study. The limitation implies that the results cannot be generalized.

3.5 Ethical considerations

According to McNeill and Chapman (2005:12-14), research can have a very powerful impact on people's lives. Therefore, ethics or moral principles have to guide research.

The ethical considerations adhered to in this study include the following:

- The participants have the right to know what the research is about, and to refuse to take part, or to answer particular questions (McNeill & Chapman, 2005:12). It was explained to the participants what the research was about, what their rights were, and that participation was voluntary.
- The researcher provided the participants with clear, detailed and factual information about the study, its methods, its risks and benefits, along with assurances of the voluntary nature of participation, and the freedom to refuse or to withdraw without being penalised (Wassenaar, 2006:61).
- The qualitative interviews and quantitative questionnaires were administered only with prior informed consent (Wassenaar, 2006:76). The consent forms were signed by the various participants, as follows:
 - Appendix K - The consent form: individual interviews

- Appendix L - The consent form: group-administered questionnaires.
- Appendix M - The child assent form

In the event that the parents or guardians could not be reached, the educators accompanying the groups were asked to sign the consent forms on their behalf. Since school groups from remote rural areas often show up at the zoo without prior notice and often have to travel long distances to the relevant zoo it was foreseen that in certain instances, it would be impossible to obtain the parents' consent. The educators then acted as guardians and gave their consent for the child/ren to participate. The learners who participated in the study signed the child assent forms.

- Learners with special education-needs were not included in this study to ensure that no learner with mental or other deficiencies would be included that would influence their capability about making decisions to participate in the study (Reynolds, 1982:9).
- The researcher ought not to engage in deception. Information must not be withheld from those taking part in the research, and the researchers must not lie about the purpose of the research. The researcher undertook to comply with this specification by explaining to the participants what the research is all about.
- The privacy of the research subjects should be safeguarded as much as possible. Although sociological research is by its very nature intrusive, and questions will be asked to determine the participants' attitudes and values towards the conservation of species and the environment, care was taken to protect the privacy of the participants.
- The identity of the participants should be kept secret (Wassenaar, 2006:76). The identity of the schools, the educators, the parents and the learners would be kept confidential.
- The participants would be protected against all physical harm. No experiments would be done on the participants and no questions would be asked that would harm the participants emotionally. The findings from the questionnaires and the interviews would not be discussed with any

participant, nor would any participant be exposed to ridicule (McNeill & Chapman, 2005:12-14).

- The legal prescriptions and morality would be adhered to by the researcher (McNeill & Chapman, 2005:12-14).
- The questionnaires would be used to only evaluate the impact of the educational programmes of the participating zoos with regard to knowledge, attitudes and values in connection with conservation and the environment. No social or personal information would be collected from the learners. No psychometric testing would be done.

3.6 Conclusion

This chapter was structured in such a way as to, firstly, elaborate on the theoretical framework that the study was based upon. Thereafter the research design, namely that of mixed methods, was discussed, as well as how it is to be applied in this study.

The methods used to collect the data, the research instruments, the sampling techniques, data-analyses, validity and reliability for both the quantitative and qualitative parts of the study were explained in detail. The delineations and limitations of the study and the ethical considerations were also discussed

CHAPTER FOUR

THE RESULTS OF THE STUDY

“Here I am, where I am supposed to be.”

Karen von Blixen-Finecke, *Out of Africa*, 1937

4.1 Introduction

The mixed-methods research design was used in this study. The data were collected by means of concurrent triangulation. The results of the quantitative study and of the qualitative study will be presented as follows:

First the results of the quantitative study will be presented, starting with a description of the demographic profile of the respondents. The total number of the primary and secondary school learners from the rural and the urban areas who participated in the study at the different zoos will be illustrated by means of figures and tables.

The number of correct and incorrect responses in the pre- and post-questionnaires, as well as the pass-rates of the respondents will be displayed in table form and by means of figures. The *pass-rate* is the percentage of the respondents who answered the questions correctly, calculated as follows, namely the number of correct answers received from the respondents divided by the number of respondents. The statistical significance of the results, determined by means of McNemar's tests, will be summarised in table form. The results of the tests are attached as Appendix N.

The qualitative study will be discussed by stating who the participants were, and then presenting the results of the qualitative study by means of the different qualitative research questions. The interview transcriptions and the coding thereof are attached as Appendix O. The integration of the quantitative and qualitative results will be done in Chapter 5.

The interview transcriptions of the qualitative study are attached as Appendix O.

The integration of the results of the quantitative and the qualitative study will be presented in Chapter 5.

4.2 The quantitative study

The following quantitative research questions were indicated in chapter 3 section 3.3.1:

- How effective are the Conservation Education Programmes presented at the zoos in the three countries in increasing the learners' knowledge, attitudes and values about wildlife and wild places?
- How do the Conservation Education programmes of the NZG compare with those of the other international zoos?

4.2.1 The demographic profile of the respondents

Two questionnaires were distributed, one for primary school learners and one for secondary school learners. There was a 100% response rate in respect of the questionnaires distributed. The pre-questionnaires were completed before the learners attended the Conservation Education programme, and the post-questionnaires after the learners had attended the programme.

(a) The primary school learners

The number of learners who participated in the study from the different primary school groups (Grade 7) at the different zoos is illustrated in Table 4.1.

Table 4.1: The number of primary school learners at the different zoos who participated in the study

School group	Number of learners			
	The NZG	The UWEC	Zoo Negara	Total
A	not applicable	30	not applicable	30
B	not applicable	25	not applicable	25
C	not applicable	20	not applicable	20
D	45	not applicable	not applicable	45
E	57	not applicable	not applicable	57
F	17	not applicable	not applicable	17
G	not applicable	not applicable	15	15
H	not applicable	not applicable	28	28
I	not applicable	not applicable	14	14
Total	119	75	57	251

A total of five hundred and two (502) questionnaires (251 pre- and 251 post-questionnaires) were received from the primary school learners. The numbers illustrated in Table 4.1 are only for one test. Where a respondent missed either one of the pre- or post- tests he or she was dropped from the analysis.

The percentages of the primary school learners from the rural and the urban areas who participated in the study are illustrated in Figure 4.1. Of the total number of primary school learners who participated in the study 64% were from rural schools and 36 % from urban schools.

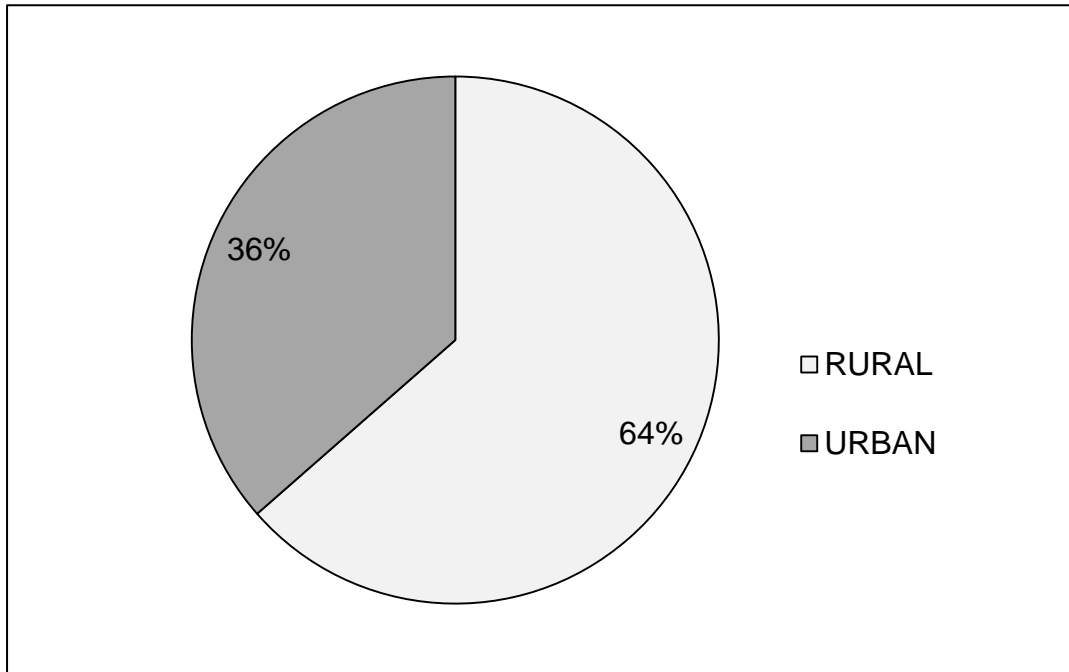


Figure 4.1: The percentages of primary school learners from the rural and the urban areas who participated in the study

Of the total number of primary school learners who participated in the study, 36% were from urban schools and 64% from rural schools. The percentages of the primary school learners from the rural areas and from the urban areas who participated in the study at the different zoos are illustrated in Figure 4.2.

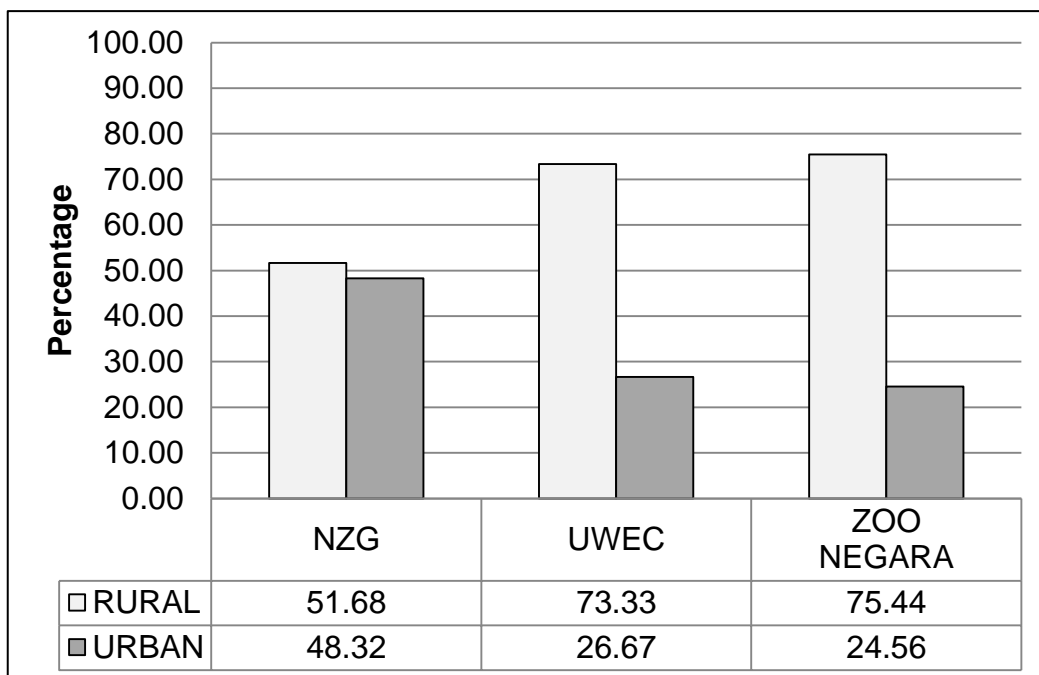


Figure 4.2: The percentages of primary school learners from the rural and the urban areas who participated in the study at the different zoos.

Three school groups at each zoo participated in the study.

At the NZG a total of 119 primary school learners completed the questionnaires, of whom 51,68% were from rural schools and 48,32% from urban schools. From the above table it can be seen that school groups D, E and F respectively constituted 45, 57 and 17 learners.

At the UWEC a total number of 75 primary school learners completed the questionnaires, of whom 73,33 % were from rural schools and 26,67 % from urban schools. School groups, A, B and C respectively consisted of 30, 25 and 20 learners.

At Zoo Negara a total number of 57 primary school learners completed the questionnaires, of whom 75,44 % were from rural schools and 24,56 % from urban schools. School groups G, H and I respectively consisted of 15, 28 and 14 learners.

(b) The secondary school learners

The number of learners from different secondary school groups that participated in the study at the different zoos is illustrated in Table 4.2.

Table 4.2: The number of secondary school learners at the different zoos who participated in the study

School group	Number of learners			
	The NZG	The UWEC	Zoo Negara	Total
J	not applicable	25	not applicable	5
K	not applicable	29	not applicable	29
L	not applicable	28	not applicable	28
M	not applicable	not applicable	19	19
N	not applicable	not applicable	15	15
O	not applicable	not applicable	39	39
P	not applicable	not applicable	25	25
Q	30	not applicable	not applicable	30

School group	Number of learners			
	The NZG	The UWEC	Zoo Negara	Total
R	36	not applicable	not applicable	36
S	23	not applicable	not applicable	23
Total	89	82	98	269

A total of 538 questionnaires (269 pre- and 269 post- questionnaires) were received from the secondary school learners. The numbers illustrated in Table 4.2 are only for one test. Where a respondent missed either the pre- or the post- test he or she was dropped from the analysis.

The percentages of the secondary school learners from the rural areas and from the urban areas who participated in the study are illustrated in Figure 4.3.

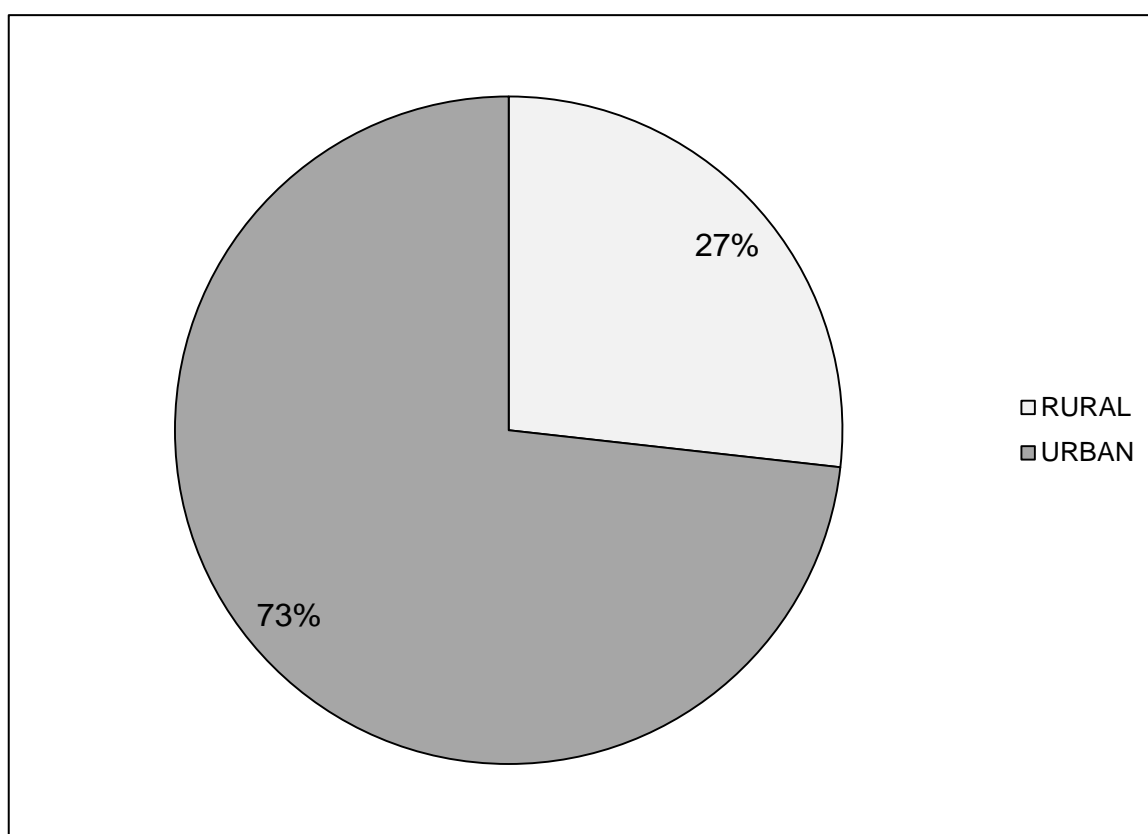


Figure 4.3: The percentages of secondary school learners from the rural and the urban areas who participated in the study

Of the total number of secondary school learners who participated in the study, 73% were from urban schools and 27% from rural schools. The percentages of the primary school learners from the rural areas and from the urban areas who participated in the study at the different zoos are illustrated in Figure 4.4.

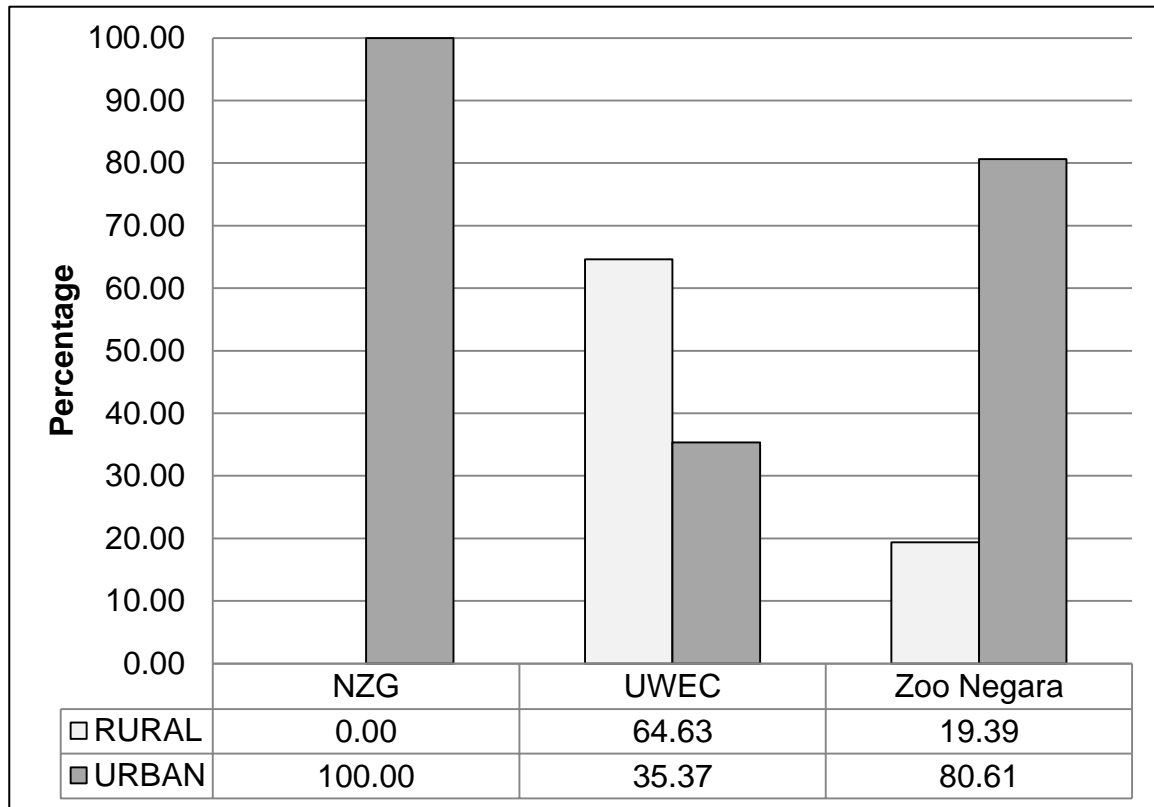


Figure 4.4: The percentages of secondary school learners from the rural and the urban areas at the different zoos who participated in the study

At the NZG 89 learners completed the questionnaires, all from urban schools. Three school groups participated in the study. School groups, Q, R and S respectively constituted 30, 36 and 23 learners.

At the UWEC a total number of 82 secondary school learners from the three different school groups completed the questionnaires, of whom 64,63% were from rural schools and 35,37% from urban schools. School groups, J, K and L respectively consisted of 25, 29 and 28 learners.

Four school groups participated in the study at Zoo Negara, of whom a total number of 98 secondary school learners completed the questionnaires. Of these learners 19,39% were from rural schools and 80,61% from urban schools. School groups M, N, O and P respectively consisted of 19, 15, 39 and 25 learners.

4.2.2 The results of the quantitative study

(a) The primary schools

The number of correct and incorrect responses in the pre- and post-questionnaires, as well as the total incorrect and correct responses are indicated in Table 4.3 below. The correct answers to the questions of the primary school questionnaire were discussed in chapter 3 section 3.3.3.5.

The pass-rates of the respondents are indicated in Table 4.4.

Table 4.3: The number of correct and incorrect responses in the pre- and post-questionnaires

Questionnaire		Pre-			Post-		
Zoo	Question	Incorrect	Correct	Total	Incorrect	Correct	Total
The NZG		Respondents: The NZG					
	Q1	48	71	119	36	83	119
	Q2	45	74	119	36	83	119
	Q3	39	80	119	43	76	119
	Q4	29	90	119	35	84	119
	Q5	45	74	119	46	73	119
	Q6	53	66	119	53	66	119
The UWEC		Respondents: The UWEC					
	Q1	17	58	75	8	67	75
	Q2	52	23	75	38	37	75
	Q3	37	38	75	16	59	75
	Q4	6	69	75	5	70	75
	Q5	7	68	75	5	70	75
	Q6	28	47	75	14	61	75

Zoo Negara		Respondents: Zoo Negara					
		Q1	12	45	57	6	51
	Q2	20	37	57	37	20	57
	Q3	21	36	57	9	48	57
	Q4	6	51	57	2	55	57
	Q5	6	51	57	4	53	57
	Q6	8	49	57	6	51	57
		Respondents: Total					
	Q1	77	174	251	50	201	251
	Q2	117	134	251	111	140	251
	Q3	97	154	251	68	183	251
	Q4	41	210	251	42	209	251
	Q5	58	193	251	55	196	251
	Q6	89	162	251	73	178	251

Table 4.4: The pass-rates of the respondents

Questionnaire		Pre-	Post-
Zoo	Question	Pass-rate (%)	Pass-rate (%)
The NZG			
	Q1	59.66	69.75
	Q2	62.18	69.75
	Q3	67.23	63.87
	Q4	75.63	70.59
	Q5	62.18	61.34
	Q6	55.46	55.46
The UWEC			
	Q1	77.33	89.33
	Q2	30.67	49.33
	Q3	50.67	78.67
	Q4	92.00	93.33
	Q5	90.67	93.33
	Q6	62.67	81.33
Zoo Negara			
	Q1	78.95	89.47
	Q2	64.91	35.09
	Q3	63.16	84.21
	Q4	89.47	96.49
	Q5	89.47	92.98
	Q6	85.96	89.47

Total			
	Q1	69.32	80.08
	Q2	53.39	55.78
	Q3	61.35	72.91
	Q4	83.67	83.27
	Q5	76.89	78.09
	Q6	64.54	70.92

Figure 4.5 illustrates the pass-rates of the total number of respondents. Figure 4.6 illustrates the pass-rates of the respondents at the NZG. Figure 4.7 illustrates the pass-rates of the respondents at the UWEC and Figure 4.8 illustrates the pass-rates of the respondents at Zoo Negara.

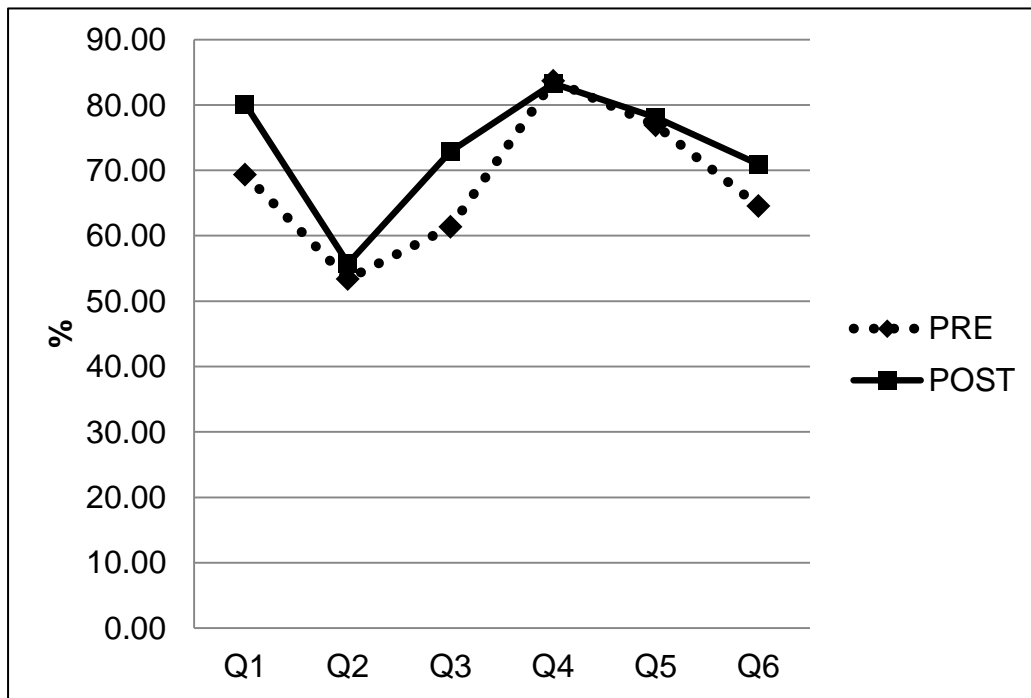


Figure 4.5: The pass-rates of the total number of the respondents

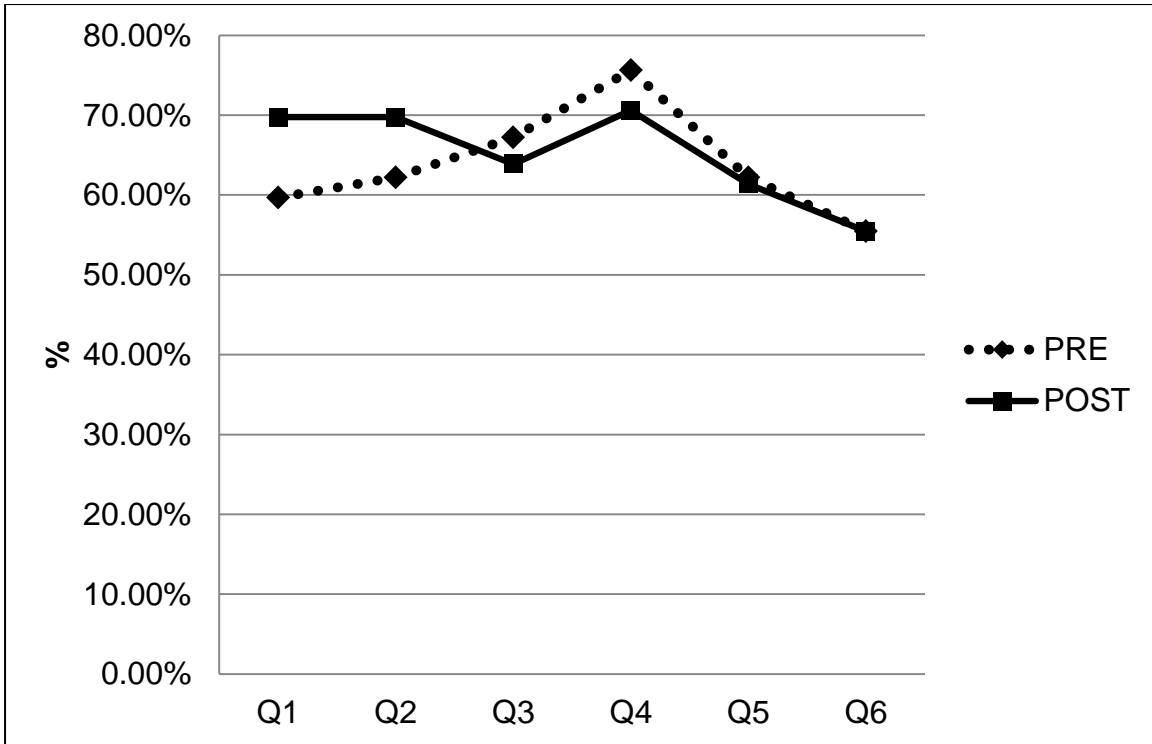


Figure 4.6: The pass-rates of the primary school respondents at the NZG

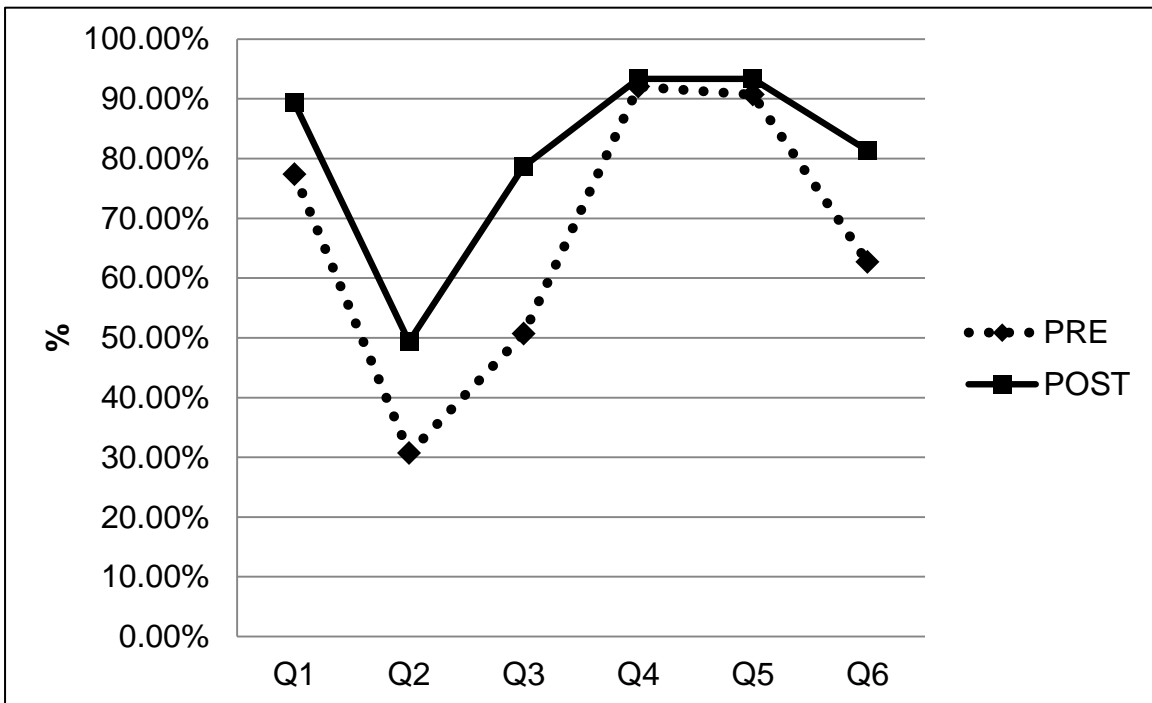


Figure 4.7: The pass-rates of the primary school respondents at the UWEC

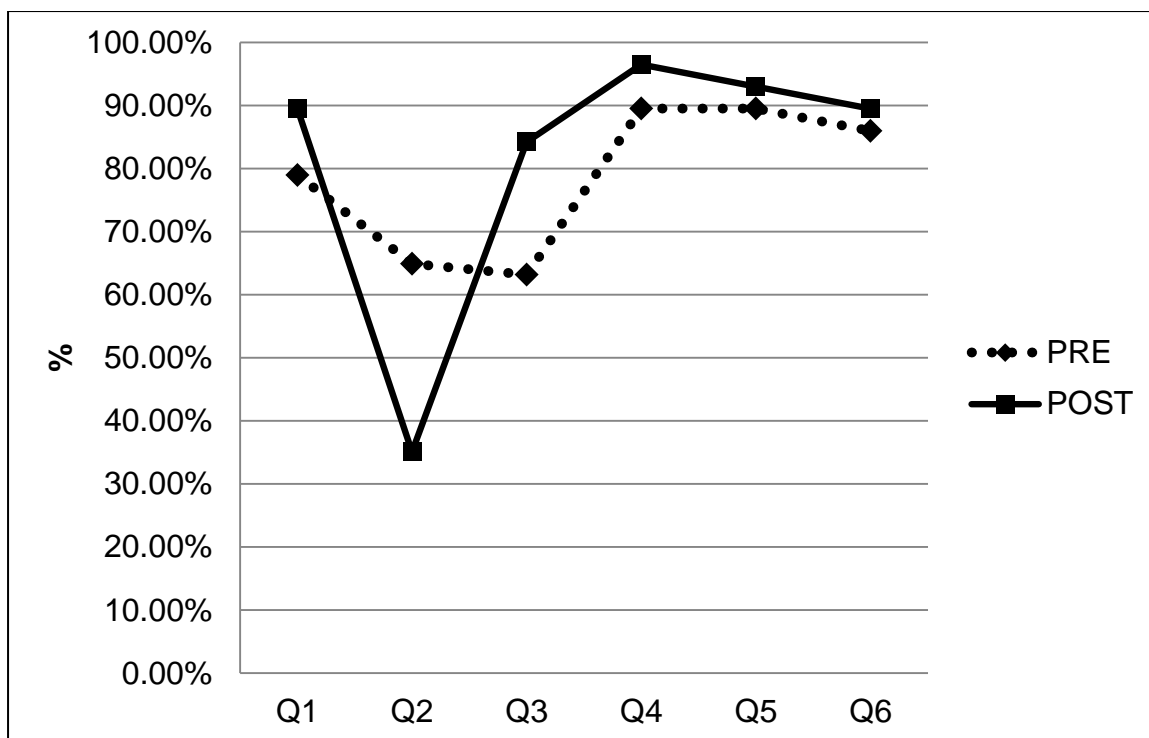


Figure 4.8: The pass-rates of the primary school respondents at Zoo Negara

(b) The secondary schools

The results obtained from the secondary school questionnaires are illustrated in Table 4.5.

The numbers of correct and incorrect responses in the pre- and post- questionnaires at the different zoos as well as the total number of incorrect and correct responses are indicated in this table. The questions were phrased in such a way that “agree” or “strongly agree” indicated a correct answer with regard to knowledge, positive attitudes and values towards the environment, and “unsure”, “disagree” and “strongly disagree” indicated an incorrect answer, or a negative attitude towards the environment.

The pass-rates of the secondary school learners are indicated in Table 4.6.

Table 4.5: The number of correct and incorrect responses in the pre- and post- questionnaires at the different zoos

Questionnaire		Pre-			Post-		
Zoo	Question	Incorrect	Correct	Total	Incorrect	Correct	Total
The NZG		Respondents: The NZG					
	Q1	30	59	89	2	87	89
	Q2	36	53	89	3	86	89
	Q3	44	45	89	9	80	89
	Q4	17	72	89	3	86	89
	Q5	45	44	89	6	83	89
	Q6	25	64	89	2	87	89
	Q7	16	73	89	3	86	89
	Q8	18	71	89	0	89	89
	Q9	16	73	89	0	89	89
	Q10	20	69	89	2	87	89
The UWEC		Respondents: The UWEC					
	Q1	27	55	82	6	76	82
	Q2	33	49	82	4	78	82
	Q3	57	25	82	42	40	82
	Q4	32	50	82	11	71	82
	Q5	57	25	82	43	39	82
	Q6	46	36	82	50	32	82
	Q7	43	39	82	42	40	82
	Q8	24	58	82	10	72	82
	Q9	3	79	82	3	79	82
	Q10	3	79	82	5	77	82
Zoo Negara		Respondents: Zoo Negara					
	Q1	22	76	98	3	95	98
	Q2	19	79	98	1	97	98
	Q3	29	69	98	3	95	98
	Q4	15	83	98	5	93	98
	Q5	71	27	98	37	61	98
	Q6	8	90	98	2	96	98
	Q7	7	91	98	0	98	98
	Q8	27	71	98	15	83	98
	Q9	1	97	98	1	97	98
	Q10	14	84	98	8	90	98

Total		Respondents: Total					
	Q1	79	190	269	11	258	269
	Q2	88	181	269	8	261	269
	Q3	130	139	269	54	215	269
	Q4	64	205	269	19	250	269
	Q5	173	96	269	86	183	269
	Q6	79	190	269	54	215	269
	Q7	66	203	269	45	224	269
	Q8	69	200	269	25	244	269
	Q9	20	249	269	4	265	269
	Q10	37	232	269	15	254	269

Table 4.6: The pass-rates of the secondary school respondents

Questionnaire		Pre-	Post-
Zoo	Question	Pass-rate (%)	Pass-rate (%)
The NZG			
	Q1	66.29	97.75
	Q2	59.55	96.63
	Q3	50.56	89.89
	Q4	80.90	96.63
	Q5	49.44	93.26
	Q6	71.91	97.75
	Q7	82.02	96.63
	Q8	79.78	100.00
	Q9	82.02	100.00
	Q10	77.53	97.75
The UWEC			
	Q1	67.07	92.68
	Q2	59.76	95.12
	Q3	30.49	48.78
	Q4	60.98	86.59
	Q5	30.49	47.56
	Q6	43.90	39.02
	Q7	47.56	48.78
	Q8	70.73	87.80
	Q9	96.34	96.34
	Q10	96.34	93.90
Zoo Negara			
	Q1	77.55	96.94
	Q2	80.61	98.98

	Q3	70.41	96.94
	Q4	84.69	94.90
	Q5	27.55	62.24
	Q6	91.84	97.96
	Q7	92.86	100.00
	Q8	72.45	84.69
	Q9	98.98	98.98
	Q10	85.71	91.84
Total			
	Q1	70.63	95.91
	Q2	67.29	97.03
	Q3	51.67	79.93
	Q4	76.21	92.94
	Q5	35.69	68.03
	Q6	70.63	79.93
	Q7	75.46	83.27
	Q8	74.35	90.71
	Q9	92.57	98.51
	Q10	86.25	94.42

Figure 4.9 illustrates the pass-rates of all the secondary school respondents. Figure 4.10 illustrates the pass-rates of the respondents at the NZG. Figure 4.11 illustrates the pass-rates of the respondents at the UWEC, and Figure 4.12 illustrates the pass-rates of the respondents at Zoo Negara.

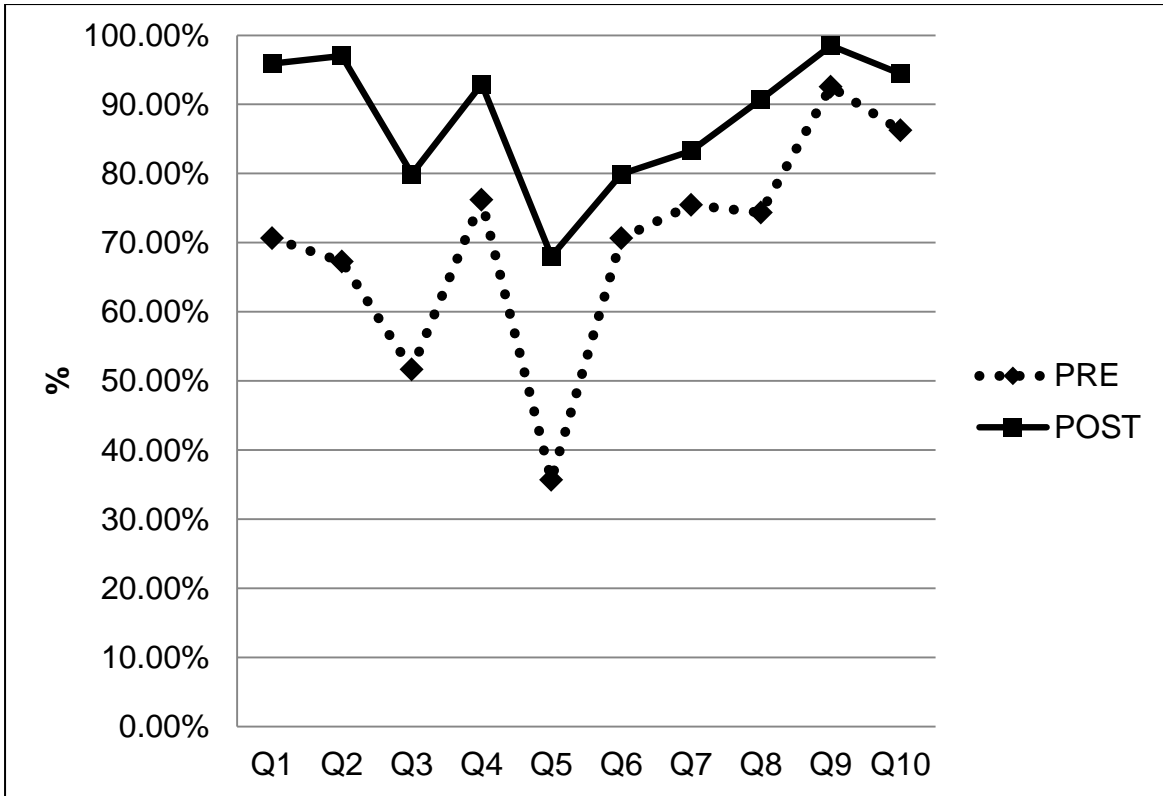


Figure 4.9: The pass-rates of all the secondary school respondents

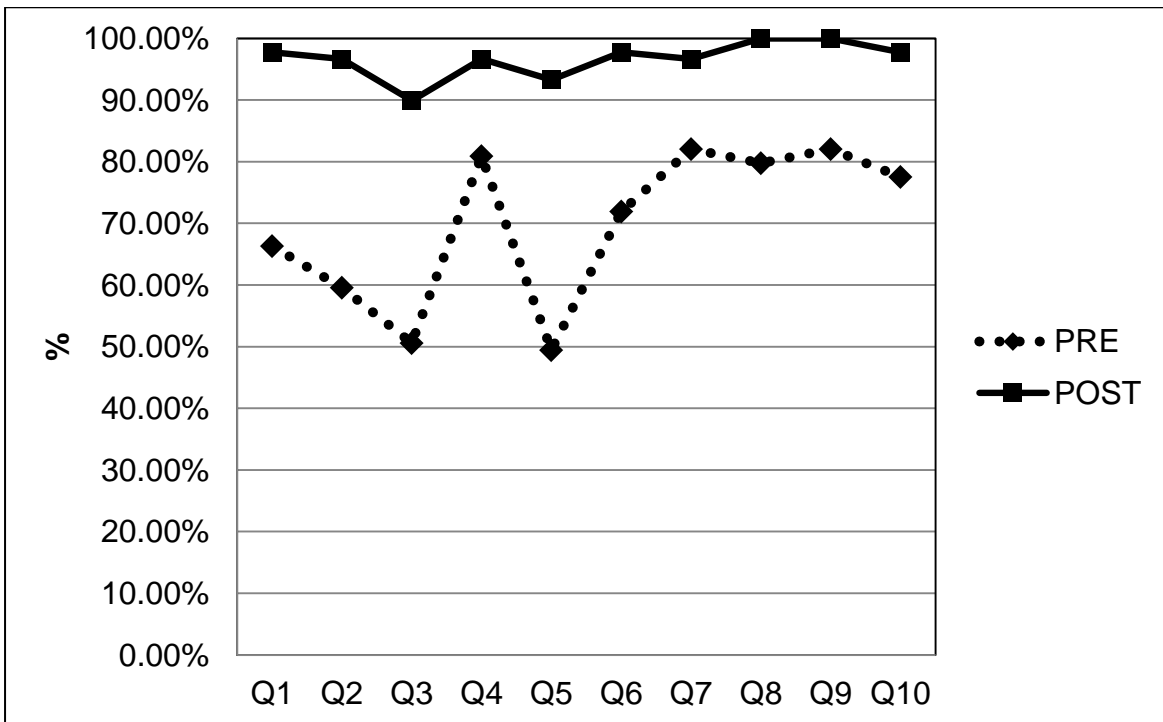


Figure 4.10: The pass-rates of the secondary school respondents at the NZG

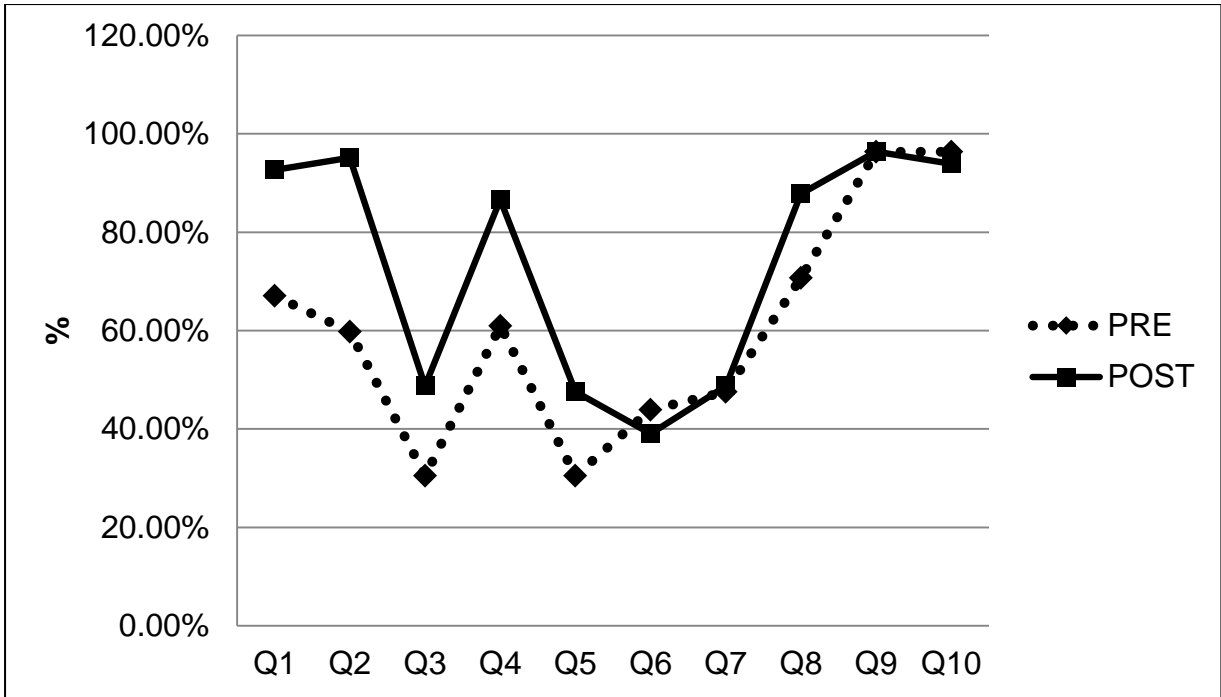


Figure 4.11: The pass-rates of the secondary school respondents at the UWEC



Figure 4.12: The pass-rates of the secondary school respondents at Zoo Negara

4.2.3 The statistical significance of the results

To determine if the differences in the proportions in section 4.2.2 were statistically significant, McNemar's tests were conducted. McNemar's test, as discussed in Chapter 3 section 3.3.3.7, is also known as a *test of correlated proportions*, and is a non-parametric test used with dichotomous nominal or ordinal data to determine whether two sample proportions based on the same individuals are equal (Morrison, 2010:780).

A probability value (p-value) is produced which indicates statistical significance if this calculated p-value is smaller than 0.05.

The results of the McNemar tests are summarised in Table 4.7 (see Appendix N).

Table 4.7: Summary of the results of the McNemar tests

Variable	Statistics	P-value	Significance
Respondents: Primary schools – The NZG			
Q1	McNemar's chi-squared = 3.1842, df = 1	0.07435	Not significant
Q2	McNemar's chi-squared = 2.0645, df = 1	0.1508	Not significant
Q3	McNemar's chi-squared = 0.2368, df = 1	0.6265	Not significant
Q4	McNemar's chi-squared = 0.6579, df = 1	0.4173	Not significant
Q5	McNemar's chi-squared = 0.00, df = 1	1.00	Not significant
Q6	McNemar's chi-squared = 0.00, df = 1	1.00	Not significant
Respondents: Primary schools – The UWEC			
Q1	McNemar's chi-squared = 5.8182, df = 1	0.01586	Significant
Q2	McNemar's chi-squared = 4.6944, df = 1	0.03026	Significant
Q3	McNemar's chi-squared = 13.7931, df = 1	0.0002041	Highly significant
Q4	McNemar's chi-squared = 0.00, df = 1	1.00	Not significant

Q5	McNemar's chi-squared = 0.10, df = 1	0.7518	Not significant
Q6	McNemar's chi-squared = 8.45, df = 1	0.00365	Highly significant
Respondents: Primary schools – Zoo Negara			
Q1	McNemar's chi-squared = 2.0833, df = 1	0.1489	Not significant
Q2	McNemar's chi-squared = 8.2581, df = 1	0.004057	Highly significant
Q3	McNemar's chi-squared = 6.7222, df = 1	0.009522	Highly significant
Q4	McNemar's chi-squared = 1.125, df = 1	0.2888	Not significant
Q5	McNemar's chi-squared = 0.1667, df = 1	0.6831	Not significant
Q6	McNemar's chi-squared = 0.0833, df = 1	0.7728	Not significant
Respondents: Primary schools – All			
Q1	McNemar's chi-squared = 11.082, df = 1	0.0008717	Highly significant
Q2	McNemar's chi-squared = 0.2551, df = 1	0.6135	Not significant
Q3	McNemar's chi-squared = 9.2235, df = 1	0.002389	Highly significant
Q4	McNemar's chi-squared = 0.00, df = 1	1.00	Not significant
Q5	McNemar's chi-squared = 0.0976, df = 1	0.7548	Not significant
Q6	McNemar's chi-squared = 3.2143, df = 1	0.073	Not significant
Respondents: Secondary schools – The NZG			
Q1	McNemar's chi-squared = 24.3, df = 1	8.244e-07	Highly significant
Q2	McNemar's chi-squared = 31.0303, df = 1	2.54e-08	Highly significant
Q3	McNemar's chi-squared = 31.2432, df = 1	2.276e-08	Highly significant
Q4	McNemar's chi-squared = 9.3889, df = 1	0.002183	Highly significant
Q5	McNemar's chi-squared = 37.0256, df = 1	1.166e-09	Highly significant
Q6	McNemar's chi-squared = 21.0435, df = 1	4.49e-06	Highly significant

Q7	McNemar's chi-squared = 7.5789, df = 1	0.005905	Highly significant
Q8	McNemar's chi-squared = 16.0556, df = 1	6.151e-05	Highly significant
Q9	McNemar's chi-squared = 14.0625, df = 1	0.0001768	Highly significant
Q10	McNemar's chi-squared = 14.45, df = 1	0.0001439	Highly significant
Respondents: Secondary schools – The UWEC			
Q1	McNemar's chi-squared = 16.00, df = 1	6.334e-05	Highly significant
Q2	McNemar's chi-squared = 22.4, df = 1	2.214e-06	Highly significant
Q3	McNemar's chi-squared = 5.2973, df = 1	0.02136	Significant
Q4	McNemar's chi-squared = 12.9032, df = 1	0.000328	Highly significant
Q5	McNemar's chi-squared = 4.9706, df = 1	0.02578	Significant
Q6	McNemar's chi-squared = 0.3214, df = 1	0.5708	Not significant
Q7	McNemar's chi-squared = 0.00, df = 1	1.00	Not significant
Q8	McNemar's chi-squared = 7.0417, df = 1	0.007963	Highly significant
Q9	McNemar's chi-squared = 0.00, df = 1	1.00	Not significant
Q10	McNemar's chi-squared = 0.125, df = 1	0.7237	Not significant
Respondents: Secondary schools – Zoo Negara			
Q2	McNemar's chi-squared = 14.45, df = 1	0.0001439	Highly significant
Q3	McNemar's chi-squared = 20.8333, df = 1	5.01e-06	Highly significant
Q4	McNemar's chi-squared = 4.05, df = 1	0.04417	Significant
Q1	McNemar's chi-squared = 12.96, df = 1	0.0003182	Highly significant
Q5	McNemar's chi-squared = 22.6875, df = 1	1.906e-06	Highly significant
Q6	McNemar's chi-squared = 2.50, df = 1	0.1138	Not significant

Q7	McNemar's chi-squared = 5.1429, df = 1	0.02334	Significant
Q8	McNemar's chi-squared = 3.3611, df = 1	0.06675	Not significant
Q9	McNemar's chi-squared = 0.00, df = 1	1.00	Not significant
Q10	McNemar's chi-squared = 1.1364, df = 1	0.2864	Not significant
Respondents: Secondary schools – All			
Q1	McNemar's chi-squared = 56.1125, df = 1	6.844e-14	Highly significant
Q2	McNemar's chi-squared = 70.9205, df = 1	2.2e-16	Highly significant
Q3	McNemar's chi-squared = 54.0865, df = 1	1.919e-13	Highly significant
Q4	McNemar's chi-squared = 28.058, df = 1	1.177e-07	Highly significant
Q5	McNemar's chi-squared = 61.124, df = 1	5.359e-15	Highly significant
Q6	McNemar's chi-squared = 9.4426, df = 1	0.00212	Highly significant
Q7	McNemar's chi-squared = 7.5472, df = 1	0.00601	Highly significant
Q8	McNemar's chi-squared = 23.7051, df = 1	1.123e-06	Highly significant
Q9	McNemar's chi-squared = 9.375, df = 1	0.0022	Highly significant
Q10	McNemar's chi-squared = 8.82, df = 1	0.002979	Highly significant

The results of the primary schools, including the number of incorrect and correct answers, pass-rates and statistical significance are summarised in Table 4.8, and the secondary school results, including the number of incorrect and correct answers, pass-rates and statistical significance are summarised in Table 4.9.

Table 4.8: Summary of the results: Primary schools

Questionnaire		Pre			Post			Pre %	Post %	Statistical Significance
Zoo	Question	Wrong	Correct	Total	Wrong	Correct	Total			
NZG										
	Q1	48	71	119	36	83	119	59.66	69.75	Not significant
	Q2	45	74	119	36	83	119	62.18	69.75	Not significant
	Q3	39	80	119	43	76	119	67.23	63.87	Not significant
	Q4	29	90	119	35	84	119	75.63	70.59	Not significant
	Q5	45	74	119	46	73	119	62.18	61.34	Not significant
	Q6	53	66	119	53	66	119	55.46	55.46	Not significant
UWEC										
	Q1	17	58	75	8	67	75	77.33	89.33	Significant
	Q2	52	23	75	38	37	75	30.67	49.33	Significant
	Q3	37	38	75	16	59	75	50.67	78.67	Highly significant
	Q4	6	69	75	5	70	75	92.00	93.33	Not significant
	Q5	7	68	75	5	70	75	90.67	93.33	Not significant
	Q6	28	47	75	14	61	75	62.67	81.33	Highly significant
Zoo Negara										
	Q1	12	45	57	6	51	57	78.95	89.47	Not significant
	Q2	20	37	57	37	20	57	64.91	35.09	Highly significant
	Q3	21	36	57	9	48	57	63.16	84.21	Highly significant
	Q4	6	51	57	2	55	57	89.47	96.49	Not significant
	Q5	6	51	57	4	53	57	89.47	92.98	Not significant
	Q6	8	49	57	6	51	57	85.96	89.47	Not significant

All										
	Q1	77	174	251	50	201	251	69.32	80.08	Highly significant
	Q2	117	134	251	111	140	251	53.39	55.78	Not significant
	Q3	97	154	251	68	183	251	61.35	72.91	Highly significant
	Q4	41	210	251	42	209	251	83.67	83.27	Not significant
	Q5	58	193	251	55	196	251	76.89	78.09	Not significant
	Q6	89	162	251	73	178	251	64.54	70.92	Not significant

Table 4.9: Summary of the results: Secondary schools

Questionnaire		Pre			Post			Pre %	Post %	Statistical significance
Zoo	Question	Wrong	Correct	Total	Wrong	Correct	Total			
The NZG										
	Q1	30	59	89	2	87	89	66.29	97.75	Highly significant
	Q2	36	53	89	3	86	89	59.55	96.63	Highly significant
	Q3	44	45	89	9	80	89	50.56	89.89	Highly significant
	Q4	17	72	89	3	86	89	80.90	96.63	Highly significant
	Q5	45	44	89	6	83	89	49.44	93.26	Highly significant
	Q6	25	64	89	2	87	89	71.91	97.75	Highly significant
	Q7	16	73	89	3	86	89	82.02	96.63	Highly significant
	Q8	18	71	89	0	89	89	79.78	100.00	Highly significant
	Q9	16	73	89	0	89	89	82.02	100.00	Highly significant
	Q10	20	69	89	2	87	89	77.53	97.75	Highly significant
The UWEC										
	Q1	27	55	82	6	76	82	67.07	92.68	Highly significant

	Q2	33	49	82	4	78	82	59.76	95.12	Highly significant
	Q3	57	25	82	42	40	82	30.49	48.78	Significant
	Q4	32	50	82	11	71	82	60.98	86.59	Highly significant
	Q5	57	25	82	43	39	82	30.49	47.56	Significant
	Q6	46	36	82	50	32	82	43.90	39.02	Not significant
	Q7	43	39	82	42	40	82	47.56	48.78	Not significant
	Q8	24	58	82	10	72	82	70.73	87.80	Highly significant
	Q9	3	79	82	3	79	82	96.34	96.34	Not significant
	Q10	3	79	82	5	77	82	96.34	93.90	Not significant
Zoo Negara										
	Q1	22	76	98	3	95	98	77.55	96.94	Highly significant
	Q2	19	79	98	1	97	98	80.61	98.98	Highly significant
	Q3	29	69	98	3	95	98	70.41	96.94	Highly significant
	Q4	15	83	98	5	93	98	84.69	94.90	Significant
	Q5	71	27	98	37	61	98	27.55	62.24	Highly significant
	Q6	8	90	98	2	96	98	91.84	97.96	Not significant
	Q7	7	91	98	0	98	98	92.86	100.00	Significant
	Q8	27	71	98	15	83	98	72.45	84.69	Not significant
	Q9	1	97	98	1	97	98	98.98	98.98	Not significant
	Q10	14	84	98	8	90	98	85.71	91.84	Not significant
All										
	Q1	79	190	269	11	258	269	70.63	95.91	Highly significant
	Q2	88	181	269	8	261	269	67.29	97.03	Highly significant
	Q3	130	139	269	54	215	269	51.67	79.93	Highly significant

	Q4	64	205	269	19	250	269	76.21	92.94	Highly significant
	Q5	173	96	269	86	183	269	35.69	68.03	Highly significant
	Q6	79	190	269	54	215	269	70.63	79.93	Highly significant
	Q7	66	203	269	45	224	269	75.46	83.27	Highly significant
	Q8	69	200	269	25	244	269	74.35	90.71	Highly significant
	Q9	20	249	269	4	265	269	92.57	98.51	Highly significant
	Q10	37	232	269	15	254	269	86.25	94.42	Highly significant

4.2.4 Discussion of the study

4.2.4.1 The demographic profile of the respondents

In section 3.3.3.6 it was stated that convenience sampling as a non-probability quota sampling method was used, where each segment of the population, namely the learners visiting the different zoos, would be represented. Although it was envisaged that, in an attempt to assure representation, three schools per age category were selected, also ensuring representation of urban and rural schools, the demographics relating to urban and rural schools were as follows:

- of the primary school learners who participated in the study, 64% came from rural schools and 36 % from urban schools;
- in the secondary school category, 73% of the learners came from urban schools and 27 % from rural schools. All the secondary school learners at the NZG came from urban schools.

All the learners from a school group were included in the sample. It was decided that three school groups in each of the two age groups would be included in the study at each of the three zoos. However, in the secondary school category at Zoo Negara, four school groups participated in the study. Two of these four groups were smaller in number in comparison to the other groups, namely group M with 19 learners and

group N with 15 learners. The total number of learners who participated in the study was as follows: 89 learners at the NZG, 82 learners at the UWEC and 98 learners at Zoo Negara.

In the primary school group category, three school groups at each zoo participated in the study. Two of the three primary school groups at the NZG were considerably larger than the other groups, namely group D with 45 learners and group E with 57 learners, while two of the school groups at Zoo Negara were considerably smaller, namely group G with 15 learners and group I with 14 learners. A total number of 119 primary school learners at the NZG, 75 at the UWEC and 57 at Zoo Negara participated in the study.

4.2.4.2 The results of the study

(a) The results from the primary school questionnaire

As discussed in Chapter 3 section 3.3.3.5, the following questions evaluated a change in knowledge:

- **The NZG:**

7. Chimpanzees are threatened animals. Correct answer: Yes

8. Rhinoceroses are poached for their horns. Correct answer: Yes

9. Wild animals make good pets. Correct answer: No

- **The UWEC:**

7. Chimpanzees are threatened animals. Correct answer: Yes

8. Rhinoceroses are found in the wild in Uganda. Correct answer: No

9. Wild animals make good pets. Correct answer: No

- **Zoo Negara:**

7. Asian elephants are threatened animals. Correct answer: Yes

8. The Milky stork is found in the wild in Malaysia. Correct answer: No

9. Wild animals make good pets. Correct answer: No

(i) The NZG Question 1: Chimpanzees are threatened animals. Correct answer: Yes

At the NZG the pass-rate for this question in the pre-questionnaire was 59.66% with 69.75% in the post-questionnaire. The computed p-value of the Chi-square test was 0.07435($\chi^2(1)=3.1842$), which is larger than 0.05, indicating no significant difference between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was no significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the NZG.

The UWEC Question 1: Chimpanzees are threatened animals. Correct answer: Yes

At the UWEC the pass-rate for this question in the pre-questionnaire was 77.33% with 89.33% in the post-questionnaire. The computed p-value of the Chi-square test was 0.01586($\chi^2(1)=5.8182$), which is smaller than 0.05, indicating significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the UWEC.

Zoo Negara Question 1: Asian elephants are threatened animals. Correct answer: Yes

At Zoo Negara the pass-rate for this question in the pre-questionnaire was 78.95% and in the post-questionnaire it was 89.47%. The computed p-value of the Chi-square test was 0.1489($\chi^2(1)=2.0833$), which is larger than 0.05, indicating no significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was no significant improvement in the number of correct answers after the learners attended the Conservation Education programme at Zoo Negara.

For all the zoos together the pass-rate for this question in the pre-questionnaire was 69.32% with 80.08% in the post-questionnaire. The computed p-value of the Chi-square test was 0.0008717($\chi^2(1)=11.082$), which is smaller than 0.01, indicating

highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programmes.

(ii) The NZG Question 2: Rhinoceroses are poached for their horns.

Correct answer: Yes

At the NZG the pass-rate for this question in the pre-questionnaire was 62.18% and 69.75% in the post-questionnaire. The computed p-value of the Chi-square test was 0.1508($\chi^2(1)=2.0645$), which is larger than 0.05, indicating no significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was no significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the NZG.

UWEC Question 2: Rhinoceroses are found in the wild in Uganda. Correct answer: No

At the UWEC the pass-rate for this question in the pre-questionnaire was 30.67% and 49.33% in the post-questionnaire. The computed p-value of the Chi-square test was 0.03026($\chi^2(1)=4.6944$), which is smaller than 0.05, indicating significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the UWEC. The pass-rate for this question was very low, even after the completion of the programme.

Zoo Negara Question 2: The Milky stork is found in the wild in Malaysia.

Correct answer: No

At Zoo Negara the pass-rate for this question in the pre-questionnaire was 64.91% and 35.09% in the post-questionnaire. The computed p-value of the Chi-square test was 0.004057($\chi^2(1)=8.2581$), which is larger than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. This indicated a decrease in knowledge. A possible explanation was that incorrect

information was given to the learners while attending the course, which emphasises the importance of training the zoo educators, as well as of their assessment to ensure that the correct information is given to the learners.

For all the zoos together the pass-rate for this question in the pre-questionnaire was 53.39% and in the post-questionnaire 55.78%. The computed p-value of the Chi-square test was $0.6135(\chi^2(1)=0.2551)$, which is larger than 0.05, indicating no significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was no significant improvement in the number of correct answers after the learners attended the Conservation Education programmes.

(iii) The NZG Question 3: Wild animals make good pets. Correct answer: No

At the NZG the pass-rate for this question in the pre-questionnaire was 67.23% and 63.87% in the post-questionnaire. There was a slight, although not significant decrease in knowledge. The computed p-value of the Chi-square test was $0.6265(\chi^2(1)=0.2368)$, which is larger than 0.05, indicating no significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. A possible explanation was that the zoo educators did not emphasize the fact that one should not keep wild animals as pets, which again emphasises the importance of their training, as well as of their assessment, in order to ensure that the correct information and messages are given to the learners.

The UWEC Question 3: Wild animals make good pets. Correct answer: No

At the UWEC the pass-rate for this question in the pre-questionnaire was 50.67% and 78.67% in the post-questionnaire. The computed p-value of the Chi-square test was $0.0002041(\chi^2(1)=13.7931)$, which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the UWEC.

Zoo Negara Question 3: Wild animals make good pets. Correct answer: No

At Zoo Negara the pass-rate for this question in the pre-questionnaire was 63.16% and 84.21% in the post-questionnaire. The computed p-value of the Chi-square test was 0.009522($\chi^2(1)=6.7222$), which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at Zoo Negara.

For all the zoos together the pass-rate for this question in the pre-questionnaire was 61.35% and 72.91% in the post-questionnaire. The computed p-value of the Chi-square test was 0.002389($\chi^2(1)=9.2235$), which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programmes.

The following questions were developed to evaluate a change in attitudes and values:

- **The NZG:**

10. It is good to eat the meat of threatened wild animals. Correct answer: No

11. I want to help to protect wild animals. Correct answer: Yes

12. Littering harms the ecosystem. Correct answer: Yes

- **The UWEC:**

10. It is good to eat the meat of threatened wild animals. Correct answer: No

11. I want to help to protect wild animals. Correct answer: Yes

12. Littering harms the ecosystem. Correct answer: Yes

- **Zoo Negara:**

10. It is good to eat the meat of threatened wild animals. Correct answer: No

11. I want to help to protect wild animals. Correct answer: Yes

12. Littering harms the ecosystem. Correct answer: Yes

(iv) The NZG Question 4: It is good to eat the meat of threatened wild animals. Correct answer: No

At the NZG the pass-rate for this question in the pre-questionnaire was 75.63% and 70.59% in the post-questionnaire. This indicated a decrease in attitudes and values in respect of the consumption of bush-meat. However, this decrease was not significant. The computed p-value of the Chi-square test was 0.6579 ($\chi^2(1) = 0.4173$), which is larger than 0.05, indicating no significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. A possible explanation is that the zoo educator may not have emphasized the fact that one should not eat the meat of threatened wild animals. It may also be an indication that it is difficult to change a person's perceptions and beliefs, and that a relatively short zoo Conservation Education programme may not be the best way of trying to achieve such a change. The initial pass-rate of 75.63 % was also much lower than the initial pass-rate of the learners at the UWEC and Zoo Negara, namely 92.00% and 89.47% respectively, indicating that the learners who participated in the study at the NZG had a much more inferior attitude towards wild animals in respect of the consumption of the meat of threatened wild animals.

The UWEC Question 4: It is good to eat the meat of threatened wild animals. Correct answer: No

At the UWEC the pass-rate for this question in the pre-questionnaire was 92.00% and 93.33% in the post-questionnaire. The computed p-value of the Chi-square test was 1.00 ($\chi^2(1)=0.00$), which is larger than 0.05, indicating no significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was no significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the UWEC, although the initial pass-rate of 92.00% indicates that the learners already had a positive attitude towards wild animals, and that they thought it was wrong to eat the meat of threatened wild animals.

Zoo Negara Question 4: It is good to eat the meat of threatened wild animals.

Correct answer: No

At Zoo Negara the pass-rate for this question in the pre-questionnaire was 89.47% and 96.49% in the post-questionnaire. The computed p-value of the Chi-square test was 0.2888($\chi^2(1)=1.125$), which is larger than 0.05, indicating no significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was no significant improvement in the number of correct answers after the learners attended the Conservation Education programme at Zoo Negara, although the initial pass-rate of 89.47% indicated that the learners already had a positive attitude towards wild animals, and that they thought it was wrong to eat the meat of threatened wild animals.

For all the zoos together the pass-rate for this question in the pre-questionnaire was 83.67% and 83.27% in the post-questionnaire. Although this indicated a small decrease, the computed p-value of the Chi-square test was 1.00($\chi^2(1)=0.00$), which is larger than 0.05, indicating no significant difference between the 'pre-' and 'post-' proportions at a 95% level of confidence.

(v) The NZG Question 5: I want to help to protect wild animals. Correct answer: Yes

At the NZG the pass-rate for this question in the pre-questionnaire was 62.18% and 61.34% in the post-questionnaire. This indicated a decrease in positive attitudes and values towards wild animals and wild places. The initial pass-rate of 62.18% was also much lower than the pass-rate of the learners at the UWEC and Zoo Negara, namely 90.67% and 89.47% respectively, indicating that the learners who participated in the study at the NZG had a less positive attitude towards wild animals in respect of their willingness to get involved in their protection.

The UWEC Question 5: I want to help to protect wild animals. Correct answer: Yes

At the UWEC the pass-rate for this question in the pre-questionnaire was 90.67% and 93.33% in the post-questionnaire. The computed p-value of the Chi-square test

was $0.7518(\chi^2(1)=0.00)$, which is larger than 0.05, indicating no significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was no significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the UWEC, although the initial pass-rate of 90.67 % indicated that the learners already had a positive attitude towards wild animals, and that they wanted to help to protect them.

Zoo Negara Question 5: I want to help to protect wild animals. Correct answer: Yes

At Zoo Negara the pass-rate for this question in the pre-questionnaire was 89.47% and 92.98% in the post-questionnaire. The computed p-value of the Chi-square test was $0.6831(\chi^2(1)=0.1667)$, which is larger than 0.05, indicating no significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that no significant improvement existed in the number of correct answers after the learners attended the Conservation Education programme at Zoo Negara, although the initial pass-rate of 89.47% indicated that the learners already had a positive attitude towards wild animals and they wanted to help to protect them.

For all the zoos together the pass-rate for this question in the pre-questionnaire was 76.89% and 78.09% in the post-questionnaire. The computed p-value of the Chi-square test was $0.7548(\chi^2(1)=0.0976)$, which is larger than 0.05, indicating no significant difference between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was no significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the different zoos.

(vi) The NZG Question 6: Littering harms the ecosystem. Correct answer: Yes

At the NZG the pass-rates for this question in the pre- and post-questionnaires were 55.46%. There was no change in the number of correct answers after the learners attended the Conservation Education programme at the NZG, indicating no change

in the learners' attitudes regarding littering. The pass-rate of 55.46% was also much lower than the initial pass-rate of the learners at the UWEC and Zoo Negara, namely 62.67% and 89.47% respectively, indicating that the learners who participated in the study at the NZG indicated a less positive attitude towards littering.

The UWEC Question 6: Littering harms the ecosystem. Correct answer: Yes

At the UWEC the pass-rate for this question in the pre-questionnaire was 62.67% and 81.33% in the post-questionnaire. The computed p-value of the Chi-square test was 0.00365($\chi^2(1)=8.45$), which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a significant improvement in the number of correct answers after the learners attended the Conservation Education programme at UWEC, which indicates a highly significant improvement in positive attitudes towards the environment and littering.

Zoo Negara Question 6: Littering harms the ecosystem. Correct answer: Yes

At Zoo Negara the pass-rate for this question in the pre-questionnaire was 85.96% and 89.47% in the post-questionnaire. The computed p-value of the Chi-square test was 0.7728($\chi^2(1)=0.0833$), which is larger than 0.05, indicating no significant difference between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was no significant improvement in the number of correct answers after the learners attended the Conservation Education programme at Zoo Negara, although the initial pass-rate of 85.96% indicated that the learners already had a positive attitude concerning the fact that littering harms the ecosystem.

For all the zoos together the pass-rates for this question in the pre-questionnaire were 64.54% and 70.92% in the post-questionnaire. The computed p-value of the Chi-square test was 0.073($\chi^2(1)=3.2143$), which is larger than 0.05, indicating no significant difference between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was no significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the different zoos.

(b) The results from the secondary school questionnaire

As discussed in Chapter 3 section 3.3.3.5, the following questions were developed to evaluate a change in knowledge:

- **The NZG**

11. Chimpanzees are endangered due to their being poached, the consumption of bush-meat, the pet trade and the destruction of the habitat.
12. A chimpanzee's DNA is about 98 % similar to a human's DNA.
13. The pet trade is a threat to the survival of tortoises and terrapins.
14. Rhinoceroses are poached for their horns.
15. Rhinoceroses' horns have no medicinal value.

- **The UWEC:**

11. Chimpanzees are endangered due to their being poached, the consumption of bush-meat, the pet trade and the destruction of the habitat.
12. A chimpanzee's DNA is about 98 % similar to a human's DNA.
13. The pet trade is a threat to the survival of tortoises and terrapins.
14. Rhinoceroses are poached for their horns.
15. Rhinoceroses are not found in the wild in Uganda anymore.

- **Zoo Negara:**

11. Orang-utans are endangered due to their being poached, the consumption of bush-meat, the pet trade and the destruction of the habitat.
12. A chimpanzee's DNA is about 98% similar to a human's DNA.
13. The pet trade is a threat to the survival of tortoises and terrapins.
14. The Malayan tigers are poached for their meat, bones and skin.
15. The Milky stork is not found in the wild in Malaysia anymore.

- (i) The NZG Question 1: Chimpanzees are endangered due to their being poached, the consumption of bush-meat, the pet trade and the destruction of the habitat. Correct answers: strongly agree and agree.**

At the NZG the pass-rate for this question in the pre-questionnaire was 66.29% and 97.75% in the post-questionnaire. The computed p-value of the Chi-square test was $8.244e-07(\chi^2(1)=24.3)$, which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the NZG.

The UWEC Question 1: Chimpanzees are endangered due to their being poached, the consumption of bush-meat, the pet trade and the destruction of the habitat. Correct answers: strongly agree and agree.

At UWEC the pass-rate for this question in the pre-questionnaire was 67.07% and 92.68% in the post-questionnaire. The computed p-value of the Chi-square test was $6.334e-05(\chi^2(1)=16.0)$, which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the UWEC.

Zoo Negara Question 1: Orang-utans are endangered due to their being poached, the consumption of bush-meat, the pet trade and the destruction of the habitat. Correct answers: strongly agree and agree.

At Zoo Negara the pass-rate for this question in the pre-questionnaire was 77.55% and 96.94% in the post-questionnaire. The computed p-value of the Chi-square test was $0.0003182(\chi^2(1)=12.96)$, which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant

improvement in the number of correct answers after the learners attended the Conservation Education programme at Zoo Negara.

For all the zoos together the pass-rate for this question in the pre-questionnaire was 70.63% and 95.91% in the post-questionnaire. The computed p-value of the Chi-square test was $6.844e-14(\chi^2(1)=56.1125)$, which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the different zoos.

(ii) The NZG Question 2: A chimpanzee's DNA is about 98% similar to a human's DNA. Correct answers: strongly agree and agree.

At the NZG the pass-rate for this question in the pre-questionnaire was 59.55% and 96.63% in the post-questionnaire. The computed p-value of the Chi-square test was $2.54e-08(\chi^2(1)=31.0303)$, which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the NZG.

The UWEC Question 2: A chimpanzee's DNA is about 98% similar to a human's DNA. Correct answers: strongly agree and agree.

At UWEC the pass-rate for this question in the pre-questionnaire was 59.76% and 95.12% in the post-questionnaire. The computed p-value of the Chi-square test was $2.214e-06(\chi^2(1)=22.4)$, which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the UWEC.

Zoo Negara Question 2: A chimpanzee's DNA is about 98% similar to a human's DNA. Correct answers: strongly agree and agree.

At Zoo Negara the pass-rate for this question in the pre-questionnaire was 80.61% and 98.98% in the post-questionnaire. The computed p-value of the Chi-square test was 0.0001439($\chi^2(1)=14.45$), which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at Zoo Negara.

For all the zoos together the pass-rate for this question in the pre-questionnaire was 67.29% and 97.03% in the post-questionnaire. The computed p-value of the Chi-square test was 2.2e-16($\chi^2(1)=70.9205$), which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the different zoos.

(iii) The NZG Question 3: The pet trade is a threat to the survival of tortoises and terrapins. Correct answers: strongly agree and agree.

At the NZG the pass-rate for this question in the pre-questionnaire was 50.56% and 89.89% in the post-questionnaire. The computed p-value of the Chi-square test was 2.276e-08($\chi^2(1)=31.2432$), which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the NZG.

The UWEC Question 3: The pet trade is a threat to the survival of tortoises and terrapins. Correct answers: strongly agree and agree.

At the UWEC the pass-rate for this question in the pre-questionnaire was 30.49% and 48.78% in the post-questionnaire. The computed p-value of the Chi-square test was 0.02136($\chi^2(1)=5.2973$), which is smaller than 0.05, indicating significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the UWEC. However, the post-questionnaire pass-rate of 48.78% was much lower than the rate that the learners achieved at the NZG, namely 93.26 % and at Zoo Negara, namely 96.94 %, showing that the learners at the UWEC were not aware of the fact that the pet trade poses risks to the survival of tortoises and terrapins.

Zoo Negara Question 3: The pet trade is a threat to the survival of tortoises and terrapins. Correct answers: strongly agree and agree.

At Zoo Negara the pass-rate for this question in the pre-questionnaire was 70.41% and 96.94% in the post-questionnaire. The computed p-value of the Chi-square test was 5.01e-06($\chi^2(1)=20.8333$), which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at Zoo Negara.

For all the zoos together the pass-rate for this question in the pre-questionnaire was 51.67 % and 79.93% in the post-questionnaire. The computed p-value of the Chi-square test was 1.919e-13($\chi^2(1)=54.0865$), which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the different zoos, which means that there was a highly significant increase in knowledge.

(iv) The NZG Question 4: Rhinoceroses are poached for their horns. Correct answers: strongly agree and agree.

At the NZG the pass-rate for this question in the pre-questionnaire was 80.90% and in the post-questionnaire it was 96.63%. The computed p-value of the Chi-square test was 0.002183($\chi^2(1)=9.3889$), which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the NZG.

The initial pass-rate of 80.90 % for this question was much higher than for the rest of the questions evaluating a change in knowledge, namely 66.29%, 59.55%, 50.56% and 49.44% respectively, and also higher than at the initial pass-rate of 60.98% at the UWEC. A possible explanation for this was that rhino poaching was a prominent issue in South Africa, and was receiving high levels of media coverage during the time of the study.

The UWEC Question 4: Rhinoceroses are poached for their horns. Correct answers: strongly agree and agree.

At the UWEC the pass-rate for this question in the pre-questionnaire was 60.98% and in the post-questionnaire it was 86.59%. The computed p-value of the Chi-square test was 0.000328($\chi^2(1)=12.9032$), which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the UWEC.

Zoo Negara Question 4: The Malayan tigers are poached for their meat, bones and skin. Correct answers: strongly agree and agree.

At Zoo Negara the pass-rate for this question in the pre-questionnaire was 84.69% and in the post-questionnaire it was 94.90%. The computed p-value of the Chi-square

test was $0.04417(\chi^2(1)=4.05)$, which is smaller than 0.05, indicating significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a significant improvement in the number of correct answers after the learners attended the Conservation Education programme at Zoo Negara.

The initial pass-rate of 84.69 % for this question was higher than for the rest of the questions evaluating a change in knowledge, namely 77.55%, 80.61%, 70.41% and 27.55% respectively. A possible explanation for this is that tiger poaching was a prominent issue in Malaysia and was receiving high levels of media coverage during the time of the study.

For all the zoos together the pass-rate for this question in the pre-questionnaire was 76.21% and in the post-questionnaire it was 92.94%. The computed p-value of the Chi-square test was $1.177e-07(\chi^2(1)=28.058)$, which is smaller than 0.01, indicating highly significant differences between the 'Pre- and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers, and therefore a highly significant increase in their knowledge after the learners attended the Conservation Education programme at the different zoos.

The initial pass-rate of 76.21% for this question was higher than for the rest of the questions evaluating a change in knowledge, namely 70.63%, 67.29%, 51.67% and 35.69%. A possible explanation for this was that rhino and tiger poaching are prominent issues in South Africa and Malaysia and were receiving high levels of media coverage at the time of the study.

**(v) The NZG Question 5: Rhinoceroses' horns have no medicinal value.
Correct answers: strongly agree and agree.**

At the NZG the pass-rate for this question in the pre-questionnaire was 49.44% and in the post-questionnaire it was 93.26%. The computed p-value of the Chi-square test was $1.166e-09(\chi^2(1)=37.0256)$, which is smaller than 0.01, indicating highly significant

differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the NZG.

The initial pass-rate of 49.44% for this question was lower than for the rest of the questions evaluating a change in knowledge, namely 66.29%, 59.55%, 50.56% and 80.90% respectively. It was noteworthy that, although the learners achieved high percentages in the previous question regarding rhino poaching, and it can be assumed that they knew that rhinos are poached for their horns, they were of the perception that rhino horns do have medicinal value. This fact emphasises the importance of programmes at zoos and other institutions to improve the learners' knowledge about endangered animals, in order to conserve these animals.

The UWEC Question 5: Rhinoceroses are not found in the wild in Uganda anymore. Correct answers: strongly agree and agree.

At the UWEC the pass-rate for this question in the pre-questionnaire was 30.49% and in the post-questionnaire it was 47.56%. The computed p-value of the Chi-square test was 0.02578($\chi^2(1)=4.9706$), which is smaller than 0.05, indicating significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the UWEC.

Zoo Negara Question 5: The Milky stork is not found in the wild in Malaysia anymore. Correct answers: strongly agree and agree.

At Zoo Negara the pass-rate for this question in the pre-questionnaire was 27.55% and in the post-questionnaire it was 62.24%. The computed p-value of the Chi-square test was 1.906e-06($\chi^2(1)=22.6875$), which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly

significant improvement in the number of correct answers after the learners attended the Conservation Education programme at Zoo Negara.

The initial pass-rate of 27.55% for this question was much lower than for the rest of the questions evaluating a change in knowledge, namely 77.55%, 80.61%, 70.41% and 84.69% respectively, indicating that the learners were not knowledgeable about the conservation status of the Milky stork before attending the programme.

For all the zoos together the pass-rate for this question in the pre-questionnaire was 35.69 % and in the post-questionnaire it was 68.03 %. The computed p-value of the Chi-square test was $5.359e-15(\chi^2(1)=61.124)$, which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a significant improvement in the number of correct answers and therefore a highly significant increase in knowledge after the learners attended the Conservation Education programme at the different zoos.

The following questions were developed to evaluate a change in attitudes and values:

- **The NZG:**

16. Consuming the meat of endangered wild animals is wrong.

17. I think we have to accept the responsibility for the destruction of the habitats of animals.

18. I can play a role in conserving rhinoceroses.

19. I believe that all living creatures are important.

20. I would like to become involved in projects to protect animals and their habitats.

- **The UWEC:**

16. Consuming the meat of endangered wild animals is wrong.

17. I think we have to accept the responsibility for the destruction of the habitats of animals.

18. I can play a role in conserving chimpanzees.

19. I believe that all living creatures are important.

20. I would like to become involved in projects to protect animals and their habitats.

- **Zoo Negara:**

16. Consuming the meat of endangered wild animals is wrong.

17. I think we have to accept the responsibility for the destruction of the habitats of animals.

18. I can play a role in conserving the Malayan tigers.

19. I believe that all living creatures are important.

20. I would like to become involved in projects to protect animals and their habitats.

(vi) The NZG Question 6: Consuming the meat of endangered wild animals is wrong. Correct answers: strongly agree and agree.

At the NZG the pass-rate for this question in the pre-questionnaire was 71.91% and in the post-questionnaire it was 97.75%. The computed p-value of the Chi-square test was $4.49e-06(\chi^2(1)=21.0435)$, which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the NZG, which indicates a highly significant improvement in their positive attitude.

The UWEC Question 6: Consuming the meat of endangered wild animals is wrong. Correct answers: strongly agree and agree.

At the UWEC the pass-rate for this question in the pre-questionnaire was 43.90% and in the post-questionnaire it was 39.02%, which showed a decrease in the learners' attitudes regarding the consumption of bush-meat, even of endangered animals. This decrease was not significant. The computed p-value of the Chi-square test was $0.5708(\chi^2(1)=0.3214)$, which is larger than 0.05, indicating no significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence.

The post-questionnaire pass-rate of 39.02% was low in comparison to the pass-rates of the other questions evaluating attitudes and values, except for question 7. The post-questionnaire pass-rates for question 7, 8, 9 and 10 were 48.78%, 87.80%, 96.34% and 96.90% respectively. The post-questionnaire pass-rate of 39.02% was also much lower than the pass-rate for this question at the NZG, namely 97.75%, and that of Zoo Negara, namely 97.96 %, which indicate that the consumption of bush-meat from endangered animals is an acceptable practice for these learners. The percentage of the UWEC secondary school learners from rural schools was 64.65 %.

Zoo Negara Question 6: Consuming the meat of endangered wild animals is wrong. Correct answers: strongly agree and agree.

At Zoo Negara the pass-rate for this question in the pre-questionnaire was 91.84% and in the post-questionnaire it was 97.96%. The computed p-value of the Chi-square test was $0.1138(\chi^2(1)=2.5)$, which is larger than 0.05, indicating no significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there existed no significant improvement in the number of correct answers after the learners attended the Conservation Education programme at Zoo Negara. However, the initial pass-rate of 91.84% for this question was already high.

For all the zoos together the pass-rate for this question in the pre-questionnaire was 70.63% and in the post-questionnaire it was 79.93%. The computed p-value of the Chi-square test was $0.00212(\chi^2(1)=9.4426)$ which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question was that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the different zoos, which indicated a highly significant improvement in their positive attitudes.

(vii) The NZG Question 7: I think we have to accept the responsibility for the destruction of the habitats of animals. Correct answers: strongly agree and agree.

At the NZG the pass-rate for this question in the pre-questionnaire was 82.02 % and in the post-questionnaire it was 96.63%. The computed p-value of the Chi-square test was 0.005905($\chi^2(1)=7.5789$), which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers, and therefore a highly significant improvement in their positive attitudes after the learners attended the Conservation Education programme at the NZG.

The UWEC Question 7: I think we have to accept the responsibility for the destruction of the habitats of animals. Correct answers: strongly agree and agree.

At the UWEC the pass-rate for this question in the pre-questionnaire was 47.56% and in the post-questionnaire it was 48.78%. The computed p-value of the Chi-square test was 1.00($\chi^2(1)=0.00$), which is larger than 0.05, indicating no significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The post-questionnaire pass-rate of 48.78% was low in comparison to the pass-rates of the other questions evaluating attitudes and values, except for question 6, and also lower than the pass-rate for this question of the NZG, namely 96.63%, and that of Zoo Negara, namely 100.00%.

Zoo Negara Question 7: I think we have to accept the responsibility for the destruction of the habitats of animals. Correct answers: strongly agree and agree.

At Zoo Negara the pass-rate for this question in the pre-questionnaire was 92.86% and in the post-questionnaire it was 100.00%. The computed p-value of the Chi-square test was 0.02334($\chi^2(1)=5.1429$), which is smaller than 0.05, indicating significant differences between the 'pre-' and 'post-' proportions at a 95% level of

confidence. The conclusion in respect of this question is that there was a significant improvement in the number of correct answers; therefore a highly significant improvement in their positive attitudes after the learners attended the Conservation Education programme at Zoo Negara.

For all the zoos together the pass-rate for this question in the pre-questionnaire was 75.46% and in the post-questionnaire it was 83.27%. The computed p-value of the Chi-square test was 0.00601($\chi^2(1)=7.5472$), which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question was that there was a highly significant improvement in the number of correct answers; therefore a highly significant improvement in their positive attitudes after the learners attended the Conservation Education programme at the different zoos.

**(viii) The NZG Question 8: I can play a role in conserving rhinoceroses.
Correct answers: strongly agree and agree.**

At the NZG the pass-rate for this question in the pre-questionnaire was 79.78% and in the post-questionnaire it was 100.00%. The computed p-value of the Chi-square test was 6.151e-05($\chi^2(1)=16.0556$), which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the NZG. The post-questionnaire pass-rate of 100.00% was much higher than that at the UWEC, namely 87.80%, and that at Zoo Negara, namely 84.69%. This indicated that the Conservation Education programme that the learners attended at the NZG was highly successful in increasing the learner's attitudes and their intention to change their behaviour regarding the conservation of rhinoceroses.

The UWEC Question 8: I can play a role in conserving chimpanzees. Correct answers: strongly agree and agree.

At the UWEC the pass-rate for this question in the pre-questionnaire was 70.73% and in the post-questionnaire it was 87.80%. The computed p-value of the Chi-square test was 0.007963($\chi^2(1)=7.0417$), which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers; therefore a highly significant improvement in their positive attitudes after the learners attended the Conservation Education programme at the UWEC. This shows that the Conservation Education programme that the learners attended at the UWEC was highly successful in increasing the learners' intention to change their behaviour regarding the conservation of chimpanzees.

Zoo Negara Question 8: I can play a role in conserving the Malayan tigers. Correct answers: strongly agree and agree.

At Zoo Negara the pass-rate for this question in the pre-questionnaire was 72.45% and in the post-questionnaire it was 84.69%. The computed p-value of the Chi-square test was 0.06675($\chi^2(1)=3.3611$), which is bigger than 0.05, indicating no significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was no significant improvement in the number of correct answers after the learners attended the Conservation Education programme at Zoo Negara.

For all the zoos together the pass-rate for this question in the pre-questionnaire was 74.35% and in the post-questionnaire it was 90.71%. The computed p-value of the Chi-square test was 1.123e-06($\chi^2(1)=23.7051$) which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers; therefore a highly significant improvement in their positive attitudes after the learners attended the Conservation Education programme at the different zoos.

**(ix) The NZG Question 9: I believe that all living creatures are important.
Correct answers: strongly agree and agree.**

At the NZG the pass-rate for this question in the pre-questionnaire was 82.02% and in the post-questionnaire it was 100.00%. The computed p-value of the Chi-square test was 0.0001768($\chi^2(1)=14.0625$), which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers; therefore a highly significant improvement in their positive attitudes after the learners attended the Conservation Education programme at the NZG.

The UWEC Question 9: I believe that all living creatures are important. Correct answers: strongly agree and agree.

At the UWEC the pass-rates for this question in the pre- and post-questionnaires were 96.34%. Although there was no improvement in the number of correct answers after the learners attended the Conservation Education programme at the UWEC, the initial pass-rate of 96.34% was already high.

Zoo Negara Question 9: I believe that all living creatures are important. Correct answers: strongly agree and agree.

At Zoo Negara the pass-rates for this question in the pre- and post-questionnaires were 98.98%. Although there was no improvement in the number of correct answers after the learners attended the Conservation Education programme at Zoo Negara, the initial pass-rate of 99.98% was already high.

For all the zoos together the pass-rate for this question in the pre-questionnaire was 92.57% and in the post-questionnaire it was 98.51%. The computed p-value of the Chi-square test was 0.0022($\chi^2(1)=9.375$), which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers; therefore a highly

significant improvement in their positive attitudes after the learners attended the Conservation Education programme at the different zoos.

(x) The NZG Question 10: I would like to become involved in projects to protect animals and their habitats. Correct answers: strongly agree and agree.

At the NZG the pass-rate for this question in the pre-questionnaire was 77.53% and in the post-questionnaire it was 97.75%. The computed p-value of the Chi-square test was 0.0001439($\chi^2(1)=14.45$), which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question was that there was a highly significant improvement in the number of correct answers; therefore a highly significant improvement in their positive attitudes after the learners attended the Conservation Education programme at the NZG. This question also dealt with the intention to change behaviour, indicating that the NZG programme was highly successful in this regard.

The UWEC Question 10: I would like to become involved in projects to protect animals and their habitats. Correct answers: strongly agree and agree.

At the UWEC the pass-rate for this question in the pre-questionnaire was 96.34% and in the post-questionnaire it was 93.90%. Although there was a slight decrease in the pass-rate, it was not significant, and the initial pass-rate of 96.34% was already high. The computed p-value of the Chi-square test was 0.7237($\chi^2(1)=0.125$), which was larger than 0.05, indicating no significant difference between the 'pre-' and 'post-' proportions at a 95% level of confidence.

Zoo Negara Question 10: I would like to become involved in projects to protect animals and their habitats. Correct answers: strongly agree and agree.

At Zoo Negara the pass-rate for this question in the pre-questionnaire was 85.71% and in the post-questionnaire it was 91.84%. The computed p-value of the Chi-square

test was $0.2864(\chi^2(1)=1.1364)$, which is larger than 0.05, indicating no significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was no significant improvement in the number of correct answers after the learners attended the Conservation Education programme at Zoo Negara. However, the initial pass-rate of 85.71% for this question was already high, indicating that the learners already had the will to become involved in projects to protect the animals and their habitats.

For all the zoos together the pass-rate for this question in the pre-questionnaire was 86.25% and in the post-questionnaire it was 94.42%. The computed p-value of the Chi-square test was $0.002979(\chi^2(1)=8.82)$, which is smaller than 0.01, indicating highly significant differences between the 'pre-' and 'post-' proportions at a 95% level of confidence. The conclusion in respect of this question is that there was a highly significant improvement in the number of correct answers after the learners attended the Conservation Education programme at the different zoos.

4.3 The qualitative study

The qualitative research questions as stated in chapter in chapter 3 section 3.3.1 are:

- How does the Conservation Education programmes of the NZG compare with those of other international zoos?
- What is the purpose of a zoo?
- Is there still a place for a zoo in modern society?

4.3.1 The participants

A total of 13 semi-structured interviews were conducted with the following persons:

- The NZG:
 - The Managing Director
 - The Education Manager

- One Senior Education Officer
- Two Education Officers

- The UWEC:
 - The Director
 - The Education and Information Manager

There was no education officer available for an interview when the research was done.

- Zoo Negara:
 - The Deputy Director
 - The Education Manager
 - One Education Officer

The Zoo Director was not available for an interview during the time of the study.

- Other key individuals in the zoo environment:
 - The Chief Executive Officer of the Johannesburg Zoo
 - The Managing Director of Two Oceans Aquarium
 - The Executive Director of PAAZAB
 - The former Managing Director of the NZG

The interviews were audio-recorded and transcribed using intelligent verbatim. *Intelligent verbatim* means that the conversations were typed as heard, but excluded all hesitations and repetitions of words, unless the repetition was used for emphasis, and also when the filler was a response to a statement or question, and it also excluded all stutters and stammers.

4.3.2 The results of the qualitative study

The interview questions are attached as follows:

- Appendix G – The interview questions. Position: Executive/Managing Director.
- Appendix H – The interview questions. Position: Education Manager.
- Appendix I – The interview questions. Position: Zoo Educator.
- Appendix J – The interview questions. Other key individuals in the zoo/conservation environment.

In order to answer the research question, “How does the Conservation Education programmes of the NZG compare with those of other international zoos?”, the Kellogg Foundation Logic Model was used to evaluate the Conservation Education programmes of the three different zoos, as described in Chapter 3 section 3.3.4.6. This Model was used to evaluate the context, namely the strengths and weaknesses of the programmes, the implementation of the programme, that is, whether the outputs were achieved, and also to determine the extent to which progress was being made toward the desired changes with regard to the short- and long-term outcomes. The impact of the programmes was not evaluated since it did not fall within the context of this study.

The results of the interviews will be presented according to the following themes, namely

- The situation/problem.
- Input/resources.
- Programme activities.
- Outputs (results of the planned activities).
- The short-term outcomes of the zoos’ Conservation Education programmes (the desired changes that may occur within a 1-3 year time-frame).
- The long-term outcomes of the zoos’ Conservation Education programmes (the desired changes that may occur within a 4-6 year time-frame).
- The impact of the zoos’ Conservation Education programmes in the community (the desired changes that may occur after 10 years).

- The weaknesses the zoos are facing regarding the Conservation Education programmes.
- The best practices/strengths of the Conservation Education programmes.
- The implementation of the Conservation Education programmes.
- Future plans/opportunities for Conservation Education.
- An evaluation of the Conservation Education programmes.
- The training of the educators.
- Accreditation to associations like WAZA, PAAZAB, South East Asia Zoo Association (SEAZA) and the Malaysian Association of Zoological Parks and Aquaria (MAZPA).
- Threats to opportunities.
- The purpose of the zoo.
- The place of the zoo in modern society.

Abbreviations were used when referring to the different participants, as indicated in the brackets below.

- The NZG
 - The Managing Director (D1)
 - The Education Manager (M1)
 - The Senior Education Officer (O1)
 - Two Education Officers (O2 and O3)
- The UWEC
 - The Director (D2)
 - The Education and Information Manager (M2)
- Zoo Negara:
 - The Deputy Director (D3)
 - The Education Manager (M3)
 - The Education officer (O4)
- Other key individuals in the zoo environment
 - The Chief Executive Officer of the Johannesburg Zoo (D4)
 - The Managing Director of Two Oceans Aquarium (D5)
 - The Executive Director of PAAZAB (D6)
 - The previous Managing Director of the NZG (D7)

4.3.2.1 The evaluation of the Conservation Education programmes of the NZG

(a) Clarifying the programme theory

The situation/problem

- Biodiversity needs to be conserved.
- Environmental problems are a threat to biodiversity. Some of these problems are overpopulation, deforestation and pollution.
- Biodiversity is threatened by poaching and the illegal trade in wild animals and the products from wild animals.

Inputs

- The Conservation Education Staff: A Manager, a Curriculum Developer, a Senior Education Officer, two Education Officers, a Public Engagement Coordinator, five education interns, a Public Engagement assistant.
- Funding from the NZG and NRF.
- Lesson plans for various activities.
- Learning support materials.
- Information boards and signage at animal enclosures.
- A Conservation Education Strategic Plan.
- Conservation Education Policies.
- A reporting framework.

(b) The programme activities

The following Conservation Education activities were offered:

- Five daily school lessons.
- Seven themed programmes at different times of the year.
- Nine different youth courses during the school holidays.
- Three different outreach lessons.
- Science shows.
- Workshops for teachers.



The audiences were:

- School groups that book lessons.
- School groups attending the daily zoo lessons.
- Learners attending the youth courses during school holidays.
- School groups attending science shows.
- ZooClub members attending different activities at the zoo.
- Teachers attending the teachers' workshops.
- Tertiary students attending lectures on request.
- The general public attending talks on conservation.

Approximately 140 000 school learners participate in the Environmental Education programmes at the NZG annually.

(c) The desired programme results

Outputs

- To increase knowledge about wild animals and their habitats.
- To increase positive attitudes and pro-environmental behaviour.
- To increase knowledge and skills in the sciences.

Outcomes

- **Short-term outcomes**

- To increase learners' performance in Life Sciences at school.
O1 said: "We want to see the children's marks increasing."

- **Long term outcomes**

- To support quality teaching and learning in the life sciences.
- To increase the interest of learners to study Life Sciences at tertiary institutions.

O2 stated: "The main purpose is to teach learners about the life science and encourage them to sort of choose careers in life sciences, and also conservation message that we teach them. For example I can give an example of a rhino poaching. If the government is giving us money we will be teaching people about the rhino, we are conserving the rhino."

- To reduce the poaching of endangered species like the rhinoceros.
O2: “So we want to send out this message to the learners, because if we teach them as they are still young, you know so, that when they become adults they will be responsible and make sure that we reduce the poaching rate that is happening in our country.”

Proposed impact

- To raise awareness in the community about nature and the environment and thus reduce their impact on nature and the environment.

According to M1: “...for our visitors to become more aware of nature and the environment, and thus have less of an impact on nature and the environment, and on the other hand, because we are a NRF facility that we also promote science understanding, and science and technology understanding in general and then also as far as career path for the youth is concern.”

- To promote environmental sustainability by changing behaviour.

D1: “...giving them practical pointers around environmental sustainability. So, I think we can change attitudes, and we can change knowledge. And hopefully change actions, change actions of people.”

(d) The evaluation study

Context

- **Weaknesses**

- Only some of the non-formal programmes are evaluated.

O1: “We do have some worksheets that we sometimes ask the teachers if they are happy with the programme if there are any suggestions.”

- Time is a constraint in the evaluation of programmes.

O2: “It is not easy to do the programme and evaluation in all the programmes, but in some of the programmes when we have time we do that.”

O3: “We have some evaluation tool that we are using to determine, the knowledge, the behaviour and attitude of learners.”

O3: “It is kind of an evaluation form, to tell us how they think, from the beginning when they start to see the programme on the website, when they phone for their kids, the reception and all those kinds of things, you know.”

- Not enough emphasis is put on Conservation Education in zoos.

M1: "I don't believe that zoos really put enough emphasis on it. There are various reasons for that. One of them being that everybody is always into conservation and research and education is seen often as sort of a second rate function."

- The marketing of the Conservation Education programmes are not done well enough.
- The Conservation Education programmes do not receive enough exposure in the media.

O2 said: "I'll say the exposure is not up to the level we will expect. Yes, there is an exposure but I think the exposure is very low. I actually wish that we can get more exposure based on the things that we are doing."

O3: "That is a very serious problem that I am having. There is not much of exposure in the media."

- More resources are needed. All three the education officers agreed, as follows:

O1: "It will be nice to have more money because it will increase the resources that we are using".

O2: "Resources, we do have resources but I think they are not enough."

O3: "So, with the money that we are having it is very limited."

- Financial support from management needs improvement.

O1: "There is not much support from management. You request that several times for money, for proper stations that when children come can be attracted, get closer too, and that's not happening."

- The training of the course presenters (zoo educators, students and interns) needs improvement.

O1: "We don't put much effort on training them. We need to improve on that."

O2: "You have to train them first and it's not a training that you can do in one day and expect them to be perfect the following day. It is something that takes time."

- More emphasis is placed on supporting the teaching of Life Sciences than on the teaching of conservation issues.

D1: "... the role that we can play is one of supporting the improvement of the quality of teaching of Life Sciences and environment education. There the role I think we can play is developing high quality educational materials that both teachers and learners can utilize in a manner that improves and enhances their ability to learn and understand."

O2: “Our main aim is to make sure the learners at the end of the day, that they follow a career in the Life Sciences.”

- There is no formal agreement in place with the Department of Education.

D1: “I think we had limited impact in that regard and I think we can reach more teachers, but what we probably need to strike some deal with the Education Department such that we can be recognized as a Life Sciences resource for Gauteng teachers, let me put it that way, even if it's just for Pretoria.”

- Ambassador animals are not used in the programmes.

- **Strengths/Best practices**

- Dedicated staff members.

O3 said: “The energy that I’m putting is equivalent to the output, you know, because I’m enjoying myself you know. It is not like work. I’m enjoying myself and I can see how my investment, the time I’m investing in the programme it’s relating into work but I’m seeing the kids developing and achieving certain things and I can now be rest assured that there are lots of indicators that it successful.”

- Support on personal level from the management is good.

O3: “From the management there is a lot of support that I’m getting and lots of support and encouragement, you know, and those are some of the things that makes me feel that the programmes are worth it to benefit the youth at large.”

- The Conservation Education programmes are linked to the school curriculum.
- PAAZAB accreditation and a member of WAZA.

Implementation

- The outputs are achieved.

O1: “An increase “Knowledge increase, attitude change: I think we are actually doing it.”

O3: “The Conservation Education that we are offering at the zoo it does actually achieve to a certain degree it does.”

- Short- and long-term outcomes are achieved.

M1: “We have a table of KPI’s and we report on those KPI on a monthly, quarterly and annual basis.”

O3: “I’ve seen a lot of students (ZooClub members) starting at Grade 7 level, as they progress up until grade 12, I’ve seen how they grow and how they are inspired and

they are getting interested in the zoo's activities. And we have some evidence now to show that there is a long term impact is most of some of the students we have identified them into different institutions.”

O1 “The ZooClub kids, the way they behaved before and when they just arrived and the way they are behaving now. You can tell that they are now understanding what they are doing.”

M1: “Yes, I do think that the programmes make a difference in the community, and can I verify that? No, I can't verify that, except anecdotally. Yes, there is evidence that students that that become scientists that we have, but at some stage we need to do a formal study and look at what the impact really is.”

(e) Future plans/opportunities

- The different roles within the Department need to be aligned.

M1 said: “First of all, to streamline the different roles within the department, and to ensure that we have a better alignment that what needs to be achieved...”

- The evaluation and monitoring of all the Conservation Education activities and programmes needs to be improved.

M1: “...and then the whole issue of monitoring and evaluation and that we actually achieve the impact that we intent to.”

- The teaching facilities (infrastructure) need improvement.

D1 stated: “The best position for us will be the establishment of the Science Centre because it will provide a focused hub to deliver programming.”

- The number of learners reached by the programmes should be increased.

O1: “I would like to see more children, especially form the rural areas, getting involved.”

O2: “To take this message of conservation to out to the communities that have not yet been reached and to make sure that they get this message and also to make sure that the learners out there that they understand life sciences and they actually follow careers in life science.”

4.3.2.2 The evaluation of the Conservation Education programmes of the UWEC

(a) Clarifying the programme theory

Situation/problem

- Biodiversity needs to be conserved.
- Environmental problems are a threat to biodiversity. Some of these problems are overpopulation, deforestation and pollution.
- Biodiversity is threatened by poaching, the consumption of bush-meat and illegal trade in wild animals and products from wild animals.
M2: “The programme we are handling is real, it is a real problem in Uganda of overpopulation, overconsumption, high level environmental degradation, deforestation, poor farming methods, overfishing, there is fish poisoning, degradation of the lakes.”
D2: “Over fifty percent of the wildlife in terms of flora and fauna is actually outside the protected areas, so we need to protect that even more.”

Inputs

- Conservation Education Staff: One manager, two education officers, 24 guides.
- Learning support materials.
- A Conservation Education Strategic Plan that has been developed in collaboration with the Department of Education.
M2 stated: “We consulted with all the stakeholders, held various workshops with all our stakeholders that we work with, including schools, the ministry of education, pupils themselves, teachers, the board members, likeminded organizations and various other stakeholders. We held various workshops to be able to bring on board everyone as we planned for our work. So we have a strategic plan, yes, we do.”
- A reporting framework.
- Brochures, fliers, booklets, posters and documentaries.

(b) The programme activities

The following Conservation Education activities are offered:

- Guided tours for all school groups visiting the zoo.

- Tailor-made programmes on request by the schools.
- Programmes for the general public run programmes “ keeper for a day”.
- Interactive programmes aimed at creating awareness within the community about the value the wildlife biodiversity.

The audiences are:

- School groups visiting the zoo.
- School groups attending the outreach programmes.
- The general public visiting the zoo.
- Communities attending the outreach programmes.

Approximately 180 000 school learners participate in the Conservation Education programmes at the UWEC annually.

(c) The desired programme results

Outputs

- To increase knowledge about wild animals and their habitats.
- To increase positive attitudes towards wild animals and their habitats.
- To increase pro-environmental behaviour.

Outcomes:

- **Short-term outcomes**
 - To reduce poaching, the trade in wild animals and their products as well as the consumption of bush-meat.
 - To reduce deforestation.
- **Long-term outcomes**
 - To conserve biodiversity

Proposed impact

- To change people’s attitudes towards the environment in order to ensure a sustainable way of living.

M2 explained as follows: “to educate the people so that we can have sustainable way of living, we can have change of life and attitude towards the environmental conservation. We can have positive set of action by individuals...”

(d) The evaluation study

Context

- **Weaknesses**

- Funding is the biggest challenge the UWEC is facing.

M2: “This institution at the moment is not yet fully self-sustaining, and gets some meagre funding from government, basically to contribute mainly to the capital development of the centre. So all the money for our operations, or the recurrent budget, at the moment is basically contributed by ourselves, generated locally by ourselves. Government has not yet put in place the institutional framework, or the legal framework to be able to fund us both for capital development and recurrent operational expenses. So we end up using only the money we collect through our innovative programmes towards a bit of sustainability. That is the only money we are able to use for our operational function.”

M2: “It will help the whole world if we can have more funding provided to your Conservation Education here where you can make a difference, where it is going to count.”

- The general public has a poor attitude towards environmental conservation due to poverty.

M2: “And then of course the others (threats) are the general environmental problems in the country, one of them being of course overpopulation in the country as Uganda... When you are talking about Conservation Education, and those issues you’re talking about sustainable management of the environment. Someone is poor and is preoccupied and is looking for income and livelihood for his family. So in the long run, it creates a problem of poor attitude towards environmental conservation.”

M2: “So those are some of the challenges, that we go out there and it takes a lot of effort and time to be able to convince people to listen to you”.

- The evaluation of outreach programmes is a challenge due to a lack of funds.

M2: “For example the project we visited yesterday...and once the funding ended, that was it...So we are struggling to keep on the monitoring of the areas that we established and to see whether people are gaining value from it. That one is difficult.”

- The evaluation of on-site programmes needs improvement.

M2 said: “We have not done very well there in terms of evaluation and I think I need to look at...to be realistic, we have not done well on evaluating our programmes.”

- **Strengths/best practices**

- Conservation Education is seen as the main mandate of the zoo.

D2: “We have basically have four mandates in order of importance, conservation, education of the Ugandan public, is number one, and the aims of that is to spearhead the conservation of our biodiversity.”

D2: “So if you have fifty percent of your wildlife biodiversity outside the protected area ...then educating and creating awareness within communities becomes very, very important because outside the protected areas you have all sorts of land ownership where people are having leases, people are having full ownership of land where they can do as they wish. So if those people are not properly educated and sensitised on the need to conserve what they have on their land, you can have a lot of loss of this biodiversity.”

- Ambassador animals are used in outreach programmes.

M2: We carry animals to these exhibitions and then use them like what you see us doing here, we use those animals in the communities, and that creates a lot of excitement.”

- All school groups visiting the zoo are obliged to follow a programme.

M2: “We are using a thematic guided tour approach.”

- Marketing is successful.

M2: “Because, like I told you, we go out very far and people know about UWEC and the people...it does very much.”

- Although UWEC is not PAAZAB accredited, they are members of PAAZAB and WAZA.

Implementation

- **Outputs**

The outputs are achieved.

- M2: “So it is working, and it is very, very promising.”

- **Outcomes**

The short- and long-term outcomes are achieved.

- M2: “I will say that we are achieving our outcomes, but not a hundred percent.”
- M2: “People are working trying to find money to feed their families, they don’t have time to relax, so they don’t go to the national parks, much as we have them, they don’t know these animals, they have not seen them. So once you take them out there, people are very interested, so they come, you pass on your message, people appreciate the interrelationship between animals and humans and environment. But you know our play, you know.”
- D2: “Yes, we are.” “...because meat here is a delicacy, for a child to refuse meat, the parents usually wanted to know who has been talking to their children and what is the message? So right now we have a restored population of sitatungas. But that also goes for animals that we have done, like in the forests we used to rescue on average ten chimpanzees a year. It’s now been two years without rescuing a single one, and these two years coincide with the community sensitisation programmes which we started in those areas. So we’ve had quite a lot of success. Our hotline for rescued animals goes off quite often. In the past it never used to, because the people used to kill the animals that they found, in their communities.”
- D2: “So this change in the attitude is evidence that our community programmes are running”. “I can see it already”.
- D2: “They have to keep the habitat, they have done that, but they want the animals in their communities because they’re realising at some point these animals could be a source of income for them through activities like ecotourism...”

(e) Future plans/opportunities

- Changing education programmes to be more interactive.

D2 has the following opinion: “We want our education programmes to be more interactive, especially for the young ages, because we realise that the attention span for the attention span is very short and therefore they need interactive things and

exercise more than a typical classroom setting and we are doing that within our centre to see that we provide interactive education or things for children to know, to measure themselves against chimpanzees, to understand how a chimpanzee lives, to understand how these live, how they can live with these animals, how they can respect wildlife and things”.

- Expand the outreach programmes.

D2: “We need to reach out to other areas of Uganda and therefore we are planning to put satellite centres within the four corners of Uganda and these satellite centres will be running programmes on biodiversity that is local to that particular area.”

- Establishing a Conservation Education network in East Africa.

D2: “So we are looking at establish harmonised programmes across the East African region, which will run between Uganda, Kenya, Tanzania, Rwanda, Burundi. So we can do trans-boundary conservation programmes for the chimpanzees or the gorillas. So these are the things which we are working on to expand our programmes here at UWEC, so that we can create impact within the society. But our main aim still remains the young generations. Because they change attitudes.”

4.3.2.3 The evaluation of the Conservation Education programmes of Zoo Negara

(a) Clarifying programme theory

Situation/problem

- Biodiversity needs to be conserved.
- Environmental problems are a threat to biodiversity. Some of these problems are overpopulation, deforestation and pollution.
- Biodiversity is threatened by poaching and illegal trade in wild animals and products from wild animals.

Inputs

- Conservation Education Staff: One Education Manager, five Education Officers, volunteers.
- An education plan.

- Standard operating procedures.
- Printed education materials.
- Worksheets and workbooks.
- Posters.
- Teachers' kits.
- A reporting framework.

(b) The programme activities

The following Conservation Education activities are offered:

- On-site discovery programme
- Custom-made programmes for schools on request.
- Outreach programmes.
- Teachers' workshops.
- Lectures for tertiary students on request.
- Courses, seminars and awareness-events for the general public.

The audiences are:

- School groups attending the on-site discovery programme.
- School groups attending the outreach lessons.
- Teachers attending the teachers' workshops.
- Tertiary students attending lectures on request.
- The general public attending courses and seminars.

Approximately 50 000 school learners participate in the Environmental Education programmes at Zoo Negara annually.

(c) The desired programme results

Outputs

- To increase knowledge about wild animals and their habitats.
- To increase positive attitudes about wild animals and their habitats.

- To increase pro-environmental behaviour.

Outcomes

- **Short-term outcomes**
 - To provide a platform as an outdoor classroom.
 - To provide a resource centre for schools.
- **Long-term outcomes**
 - To create awareness of wildlife conservation and the environment.

The proposed impact

- To play a role in the conservation of biodiversity and the environment.

(d) The evaluation study

Context

- **Weaknesses**
 - Not sufficient funds to change exhibits in order to modernize the zoo.
 - The teachers are negatively influenced to bring their learners to the zoo because of all the paperwork that they have to complete.

O4: "Teachers who are interested to take our programmes need to do plenty of paperwork and this often deters them from taking the package."
- **Strengths/best practices**
 - One two hour-long programme is offered to the school groups, namely the discovery programme.
 - A formal agreement between the zoo and the Department of Education is in place for the zoo to offer outreach programmes. These outreach programmes are funded by private companies like banks.
 - All programmes are evaluated.

M3: "After a certain session we have an assessment form, so we distribute to all the audiences that we are phasing through and they give a comment and also

feedback for all our programmes in the zoo. We analyse it and then we have a brainstorming session, a debrief session, among our team and we do some changes...”

D3: “We have either interview or they will write, so from that we will be able to tell how successful we are in terms of, for example, education, how successful we are in educating them. Did they learn something on our exercise? So yes, we do.”

- Marketing and branding is sufficient.

M3: “It’s very important that one because we have a sense of belonging and then we are representing the organization.”

- The Education Department has an art and creative centre, a resource centre, a training unit and a research unit.
- Lessons are developed by means of teamwork and brainstorming sessions, also involving the conservation staff.

O4: “I helped to develop the modules and brainstorm my ideas with the Education team before I execute the programmes.”

O4: “I do research on programmes from other zoos for ideas. I also discussed my ideas to my team. We will develop the teaching props together. As it is a zoo programme, it also involved the Zoology department. Whatever programmes we do, we will also consult the curator.”

- Members of WAZA, South East Asia Zoo Association (SEAZA) and Malaysian Association of Zoological Parks and Aquaria (MAZPA).
- Staff training receives high priority.

O4 said: “Training means we continuously train our staff, because in order to be a world class zoo.”

O4: “I was given an opportunity to attend a 5-day Environmental Interpretation workshop organised by FRIM.”

O4: “Currently, presenters are only the education officers. Prior before any officers conduct the programmes, they will have to go through certain training sessions conducted by either me or my supervisor.”

- All school groups visiting the zoo are encouraged to attend a programme..
- D3: “Our education department will select if they see that the teacher will have no proper planning for them, so we will take over.”
- Ambassador animals are used in the programmes.
 - The zoo’s focus is broad, and is referred to as the “seven-in-one concept”.

D3: “seven-in-one means we have mammals, amphibians, reptiles, birds, plants, insect, because people focus on, for example, year of the gorilla, year of the tiger, only the tiger, but what is the track habitat loss? If it is habitat lost, even a small insect will suffer, that is why we putting everything in, so that they will know that, you...we have to take care for not just one.”

Implementation (executed as planned, evaluation)

- The outputs are achieved.

M3: “Because we have this feedback from the customers and, focusing on one issue, we have one programme, discovery programme, so we do receive return visits from them.”

- The short- and long-term outcomes are achieved.

M3: “I think we can give a big impact to the community.”

D3: “...in order for you to have a vision and mission, there must be some measurable goals. ... So among our staff, we do the gap analysis, which is we test them on their attitude, skills and knowledge. So we work on that, and when you mention just now, are we where we were supposed to be? Yes we are.”

O4: “Definitely. It is a different experience for everyone as we conduct our programme 99 % outdoor.”

(d) Future plans/opportunities

- A botanical garden will be developed on the zoo’s premises.
- A zoo gallery with animal artefacts are in the process of being developed.

For the purpose of answering the research questions “What is the purpose of a zoo?” and “Is there still a place for a zoo in modern society?” the interviews were coded, clustered into categories and then interpreted.

4.3.2.4 The results of the research questions

(a) “What is the purpose of a zoo?”

The following categories were identified:

- **Zoos are showcases for wildlife biodiversity**

Although zoos are often seen as institutions that support conservation, including saving species from extinction that have vanished from their wild habitat, the main function of zoos is not conservation but rather, to act as a showcase for wildlife biodiversity.

D1 said: “The purpose of zoos is to kind of act as a showcase for global wildlife biodiversity. But in the process of acting as a showcase, the zoo obviously has to manage the animal collection, whenever possible also to play a role in conserving the counterpart of the species that we have out in the wild as far as possible.”

- **Zoos connect people with nature**

D6 stated: “We need zoos in Africa for exactly the same reason that Europe does. We have urbanised populations that cannot afford and will never during the course of their lifetime ever get out into those game reserves to see those wild animals and if we’re going to instil any value, any conservation value, into our populations to make them understand how important environmental issues, conservation issues, are then they have to have access to some level of contact with animals and that’s where zoos and aquariums come in.”

D6: “They provide that and I would foresee the absolute need that zoos start developing far more comprehensive ambassador animal programmes to allow people a greater level of contact to make that mental and, most imposed importantly of all, emotional connection because unless they do that, then we really don’t stand a hope in hell. The short answer then for that function of zoos as my colleagues connecting people with nature.”

Conservation of species

The conservation of species is a very important aspect of zoos and is seen in some zoos as the main function.

D3 said: "Why conservation becomes the first one? Because that is what we do. That is what we are supposed to do, and the next should be education."

Although there is evidence of successful breeding programmes and of re-introducing these animals back into the wild, there is the opinion that zoos can do much more regarding the conservation of species:

D7 explained as follows: "The conservation issue can be debated. I know that there are many instances where we already have more animals in an ex situ environment in a zoo than in the wild. Siberian Tiger is an example. There are some flagship species where zoos have been instrumental in breeding them successfully and re-introducing them back in the wild, so those conservation principles are there. But I'm not so sure whether we really, in zoos, perform to the nth degree our opportunities in terms of conservation."

Zoos can play an important role in the conservation of species through captive breeding programmes by establishing insurance populations for when that animal becomes extinct in its natural habitat, or to release it back into its natural habitat.

D7 opinion is as follows: "Genetically speaking, we are fragmenting populations more and more because of man-made barriers that we create. So other than just being an entertainment area, zoos still are the last bastions for endangered species, not necessarily to show a person what an endangered species look like but as a genetic reservoir for once things get better.

D7: "I'm encouraged, for instance, when I heard recently of a decision to extend the national parks of South Africa, which is fantastic news. That gives greater opportunity for us to reintroduce animals back into the wild. So where will those animals come from? And that is certainly a role that zoos globally can perform."

However, if the reasons why the animal became extinct still exist in its natural habitat, the chances are that the releasing of the animals back into the wild will not be successful.

D7: "Conservation of both the animal and the habitat where the animal would ordinarily exists must take place. Once you've taken it out of its habitat, the greatest contribution that you can make for that animal if it is endangered is through conservation breeding of either to act as an insurance population for once the animal is extinct in the wild."

D7: "You don't just release an animal in the wild if the circumstances that caused the animal to decline are still there." "Let's face it, just to accept the fact that you save the animal in the zoo but the environment is being destroyed. It's really...it's like eating an ice-cream without sugar in it. The animal in the zoo should be an ambassador so if zoos are sincere in their conservation principles, they have to extend an arm to the environment as well."

M1: "There are obviously different levels in which zoos are doing that. Some of them are going into a lot of detail and are really doing an excellent job, and others don't put a lot of emphasis on it."

- **Education**

All of the participants that were interviewed agreed that zoos are in an excellent position to provide Conservation Education.

D7: "Let's face it, educational opportunities are really fantastic and you can go to the nth degree in justifying that. More than seven hundred million people visit zoos around the world every year. For many people, that is the only opportunity they will have access to a wild animal. You can't ignore that. It's a fact. Even in South Africa with all the wonderful nature reserves that we have around the country. To many people, those places are not available. They [are] inaccessible because of the cost involved and the only time that they could really see a wild animal would be in a zoo. So, that is a draw card but the question is what do you do with that person now and what value do they get out of their visit? And that's a great responsibility on the Education Department to be able to let that person leave the facility with a better knowledge of its environment, not only of the animal, its environment, but we talk about environments. So the educational function is a critically important aspect for a zoo."

D6: "I found, by and large, that the majority of African zoos that I have visited actually have very strong Conservation Education programmes comparatively speaking. ...So I would have to say that the majority of African zoos that I have visited do fully understand their Conservation Education role."

M1: "...it depends a little bit on what zoo we are talking about, but in my opinion the main purpose of a zoo should be education because zoos really have wonderful opportunity to educate formally or informally the target audiences."

D2: "We have basically have four mandates in order of importance, conservation, education of the Ugandan public, is number one, and the aims of that is to spearhead the conservation of our biodiversity".

D5: "Our primary thrust is education. We're doing...we're dabbling in conservation. We're doing a little bit here, a little bit there, we're involved but it's not our primary thrust. Our primary thrust is education."

D5: "I see zoos and aquariums as interfaces between the public and science, so our role in conservation is actually educating people as to what's going on in the natural world as seen by our scientists."

D4 argued: "I think every learner that comes in should have an educational programme attached for their visit."

However, zoos need to put more money towards their Conservation Education programmes:

D4: "You need to strive for what's right. If you see the zoos that I've seen, you need it more than you can imagine."

D4: "They've done some fabulous ones and they put a lot of effort into it. Do we achieve it? No, we're understaffed when it comes to the number of people we see. The programmes I've seen that they do, are very lovely ones but understaffed, don't reach everyone. It's a bit haphazard so, no, we don't nearly...and I think if we really going to make a difference, because that is what we want to do, we need to get those programmes sorted out and the educational programmes sorted out and put a lot more money into education."

D4: "Putting more resources towards education. That is what is going to save us in the long run."

- **Agents in changing behaviour**

The hope exists that zoos are able to change human behaviour.

D5: "Well I think that what we want to do, we want to see people leave the aquarium saying oh my goodness, I understand, I understand that I am a part of all these processes and I need to change so...and I need to change not only my thinking but my behaviour. I need to go home and do things differently to what I'm doing now that would be my ultimate."

D5: "I think that behaviour is a choice. When you have a choice you can change that choice."

D5: "All of us in aquariums and zoos would like to believe that we're changing people's attitudes and behaviour but actually even though there are lots of studies on that aspect of

what we're doing there's not too much evidence that we're actually doing it. All we do is live in hope that what we do is making a difference."

D7 recommended that Conservation Education programmes should inspire the learners to practice environmental conservation.

"That's what the education programme should do. Not necessarily to give them a quiz programme to say is the lion bigger than the tiger. That's got...it's what I call it useless information. It's interesting at that time. That person must get out of that zoo encouraged to go to his own backyard and start practicing conservation, environmental conservation."

- **Research**

Zoos have a great potential in contributing in the research field, however, the research role of zoos is underplayed.

M1: "Zoos can contribute a lot in the research field, as far as certain areas of study are concerned and then obviously zoos can also contribute a lot by looking at animals in their natural habitat which many zoos are doing."

D5: "There's a whole lot of stuff that can be done in the zoos that you can't do in the wild and I think that's where zoos and aquariums need to focus, they need to actually focus where can we actually slot into this to really make the biggest difference in those fields and it's there, it's waiting."

D7: "I was really shocked that of all the zoos that we visited, probably only two or three could really claim to be part of research."

D4: "We'll do research but it will be conservation research."

- **Recreation**

The recreation role of zoos is utilized as a business to make the money necessary for the conservation activities, and at the same time the visitors are seen as an audience for the education activities of the zoo.

D7: "Zoos often just make lip service to their pillars of justification and very few zoos actually conform to all those issues but, in the end, it is a place for entertainment. You can't ignore the fact that ten percent of the world population visit the zoo once a year."

O1: "People don't have much to do out there so zoo is one of the entertainment areas. And it is our chance to we make it an educational institution. So the people coming for entertainment, we educate them."

D3: “And then we need money to run the zoo, so we not...I’m not saying we are really focusing a lot on recreation, but that is how we get in people.”

D6: “You need to bear in mind that the reason that people come to zoos is not because they want to learn about animals, they come for fun.”

D4: “I think a lot of what we mustn’t forget is that we actually do have a facility that people come to relax, come to be educated, come to sometimes just watch the animals.”

- **Economic contributor**

The recreation role of zoos is utilized as a business to make the money necessary for the conservation activities, and at the same time the visitors are seen as an audience for the education activities of the zoo.

D6: “There are between ten to fifteen thousand organisations...facilities out there on this planet that go by the name zoo. Only eleven hundred of those fall within the World Association of Zoos and Aquariums’ ambit. Of those eleven hundred zoos, between them they generate three hundred and eighty million US dollars a year that is fed directly into in situ conservations. That’s more than the worldwide life fund. So do zoos contribute to the saving of endangered species? Unquestionably.”

D4: “The zoos are now the third highest contributor, funding wise, to conservation in the wild which is quite a phenomenal fact and it’s probably understated. I know some zoos specifically that have made critical differences. Absolutely critical differences. Is it enough? No.”

D7: “Zoos fulfil an incredible part of the social environment. You can’t just close down a zoo in terms of worldwide things. It will have catastrophic effects on the economy.”

(b) Is there a justification for the existence of zoos?

Zoos are often considered not to be of a good enough standard:

D4: “Things are not perfect and that is very frustrating for me and that’s what makes me doubt sometimes because I know what they...what some of them should have I can’t give it to them and so a future in the future. If you can do it properly, yes. Everything must be large enclosures, you must have your five freedoms and if you got that, absolutely.”

African zoos are facing a huge problem regarding resources to maintain good standards, both in respect of having proper facilities and to employ skilled people:

D7: "In zoos in general all over the world you have a few, percentage wise, good zoos in the world, considering the fact that there are probably in excess of five to ten thousand zoos worldwide. Of that, one would probably quantify to say that five percent are good zoos and, even in Africa, you have the same situation. There are terribly bad zoos in Africa. There are even bad zoos in South Africa."

D7: "...to try and improve the zoos but it's a long process and it's a very expensive process and you must always relate the quality of the zoo with the quality of standard of living in that country. You can't expect to have a good zoo in a country which is stricken with poverty. They will not allow the zoo to be a great and excellent zoo. So, it's very difficult to compare zoos."

M1: "I think that resources are a severe limitation, and that obviously has an effect on everything else."

D1: "There is also no money to employ qualified and passionate people, people that are passionate about wildlife. So that is the biggest problem. I don't think it's a cultural or other issue. You know, those people are just as passionate about the animals that they look after."

D4: "It's money and it's skill. I've travelled all over Africa. I know, it's money and skill."

D4: "It's just a problem of not having enough money, say, to have proper facilities."

M1: "I think on the hand that zoos and aquariums do a wonderful job and on the other hand I think that they can also do more. I think that certain zoos really do an excellent outstanding job. Other zoos and aquariums should rather be closed down. So there are some good zoos and programmes and there are some really bad ones, but in general I think that zoos can really do more as far as their impact is concerned."

Although zoos have a challenge regarding their standard, they have an important role to play in linking humans with nature, and this role is becoming more and more important as the pressure on the environment and biodiversity increases.

D1 said: "I believe that good quality zoos can play an important role in helping know and understand wildlife."

D1: "There are very few people that have the means to go out to the parks. They don't have transport. There's no public transport to national parks and they don't have money".

D1: "And I hear people talk about we now have the internet and all that. It's different, you know. You can't smell the animal droppings over the internet. The whole experience is very different, and we still have an opportunity to see animals, those that still exist. Why would we just walk away from that? And in any case there are not sufficient open spaces across the world where animals could be and in such that people can also could go and see them. You can't just walk away from that. It is just not possible."

“Zoos also take the pressure away from parks. Because imagine that all the people that went to the zoo now had nowhere to else to go, they would all now go into the parks which now cause more environmental damage, and undermine whatever conservation issue is taking place.”

O2: “Zoos - they still have a place and a big role to play. Most especially when looking what is happening at the example of rhino poaching that I gave. The message of conservation is actually a challenging message to them (learners) that they still need to learn and they need to understand it better. And the zoo is there to give them this.”

M2: “It can be a place that you can see, you can do research and you can educate your children, and you do have to conserve certain species of animal that lack or maybe lessen, become lesser and lesser. So you should have the zoo, and you should support the zoo.”

D3: “There are forest out there but if you were to bring them out there the chances of them seeing tiger, for example, is very rare...But in the zoo setting...They can see, they can smell, they can hear the tiger, how it moves and all.”

D5: “I have no doubt that it’s worth keeping zoos and aquariums. We’ll go around and around and around this big discussion about whether we should be holding animals in captivity. The rate the human race is going at the moment, they may be the only animals left one of these days...Where does the public go? Where do they go to see things, to do things, to interact with nature? Very few, very little scope and then, unfortunately, we tend to be very Eurocentric or western centric people and think of everybody in terms of our beliefs, what we believe we should be doing to animals. There are a whole lot of people out there who have totally different views and, if we didn’t have zoos and aquariums, their children and children’s children would never have the opportunity of interacting with animals and if you don’t interact with them you’re not going to care for them, you’re not going to love them, you’re not going anywhere.”

D5 said: “I think that the world’s a frightening place today and they are...I think they are becoming more important in terms of getting people to relate to where they are in the world and to reconnect with the nature side of things. I think that we’re losing nature. I think it’s very easy to lose nature, especially in cities and most of us live in cities, like nature’s out there somewhere. Actually, it’s not and so we’ve got a fundamental task to actually bridge that.”

D7 concluded: “So zoos place fulfil a very important recreational level so, I don’t...I’ve read many stories, I’ve seen many stories, what would the world be without a zoo? It will never happen and I think it will become increasingly important but zoos continuously...and they are doing.”

4.4 Conclusion

In this chapter the results of both the quantitative and qualitative studies were presented.

The quantitative data were presented by means of tables and figures. The results of the questionnaires were discussed in respect of all the questions for each zoo. The qualitative data were presented by addressing the research questions.

The summary of the findings, the conclusions and the recommendations will be presented in Chapter 5.

CHAPTER FIVE

SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

*When you have caught the rhythm of Africa,
you find out that it is the same in all her music.*

- Karen von Blixen-Finecke: *Out of Africa*, 1937 -

5.1 Introduction

The poaching of rhinoceroses in South Africa, home to the majority of the world's rhino population, has increased dramatically in recent years. Many of the factors driving this increase are economic, with the surging prices for rhino horn being one of them (International Fund for Animal Welfare, 2013:10). At the same time, the illegal trade in wild animals and their products, as well as the consumption of bush-meat and deforestation are posing a threat to the survival of species like tigers in Malaysia and chimpanzees in Uganda. There is not much time left for these species - urgent action is required if these species are to be conserved. Zoos have a very important role to play in the conservation of endangered species, not only as genetic reservoirs, and for the re-introduction of species in their habitats, but also to change people's attitudes and behaviour towards wildlife and wild places.

The findings of this study is summarised in section 5.2 in the form of a table, comparing the results of the quantitative and qualitative studies at the different zoos. Conclusions are made of the study in section 5.3 by addressing the research questions. Thereafter recommendations are made in section 5.4 to ensure the effectiveness of the Conservation Education programmes of zoos, taking in consideration the literature review, the recommendations made by the participants of the qualitative study, the findings of the Logic Model evaluation study, as well as the findings of the quantitative study. The purpose of these recommendations is to propose a model for effective Conservation Education programmes in zoos. In the last section, section 5.5, suggestions for further research are made.

5.2 Summary of the findings

The findings of this study are summarised in Table 5.1.

Table 5.1: A summary of the findings

Zoo	NZG	UWEC	Zoo Negara
Number of learners reached annually	Approximately 140 000	Approximately 180 000	Approximately 50 000
Conservation Education staff members	11	27	6
Number of on-site Conservation Education programmes offered	Five daily lessons and seven themed programmes are offered at different times during the year.	One on-site programme, as well as other lessons on request.	One on-site programme, as well as other lessons on request.
The results of the quantitative study: Evaluation of the Conservation Education programmes			
The Conservation Education programme that was evaluated	Endangered-animal guided tour	On-site guided tour	Discovery programme
Key messages of the Conservation Education programme	<ul style="list-style-type: none"> • South Africa has a wonderful variety of animals and plants. • Some of South Africa's animals are threatened by <ul style="list-style-type: none"> ○ poaching ○ exotic pet trade ○ the bush-meat trade 	<ul style="list-style-type: none"> • Uganda has a wonderful variety of animals and plants. • Some of Uganda's animals are threatened by <ul style="list-style-type: none"> ○ poaching ○ exotic pet trade ○ the bush-meat trade 	<ul style="list-style-type: none"> • Malaysia has a wonderful variety of animals and plants. • Some of Malaysia's animals are threatened by <ul style="list-style-type: none"> ○ deforestation ○ illegal pet trade ○ poaching • You can play a very

	<ul style="list-style-type: none"> ○ deforestation ○ climate change • You can play a very important role in protecting the animals and their habitat. 	<ul style="list-style-type: none"> ○ deforestation ○ climate change • You can play a very important role in protecting the animals and their habitat. 	important role in protecting the animals and their habitat.
Number of learners that participated in the study	Primary Schools		
	119	75	57
	Secondary Schools		
	89	82	98
Demographic profile of the learners who participated in the study	Primary Schools		
	51,68 % from rural schools:	73,33 % from rural schools:	75,44 % from rural schools:
	48,32 % from urban schools:	26,67 % from urban schools:	24,56 % from urban schools:
	Secondary Schools		
0,00 % from rural schools:	64,63 % from rural schools:	19,39 % from rural schools:	
100,00 % from urban schools:	35,37 % from urban schools:	80,61 % from urban schools:	
How effective is the Conservation Education programme in increasing the learners' knowledge about wildlife and wild places?	Primary Schools		
	Not effective* and low initial pass-rate	Effective*	Effective* for one question, not effective for one question that had a high initial pass-rate, and there was a decrease in knowledge in one question
	Secondary Schools		
	Effective*	Effective*	Effective*
How effective is the Conservation	Primary Schools		
	Not effective* and low initial pass-	Not effective*, but high initial	Not effective*, but high initial

Education programmes in increasing the learners' attitudes and values about wildlife and wild places?	rate	pass-rate	pass-rate.
	Secondary Schools		
	Effective*	Not effective*	Effective* for one question, not effective* for four questions, but these questions had a high initial pass-rate
The results of the qualitative study: Evaluation of the Conservation Education programmes			
(a) Clarifying the programme theory			
The situation/ problem	<ul style="list-style-type: none"> • Biodiversity needs to be conserved. • Environmental problems are a threat to biodiversity. Some of these problems are, namely overpopulation, deforestation and pollution. • Biodiversity is threatened by poaching and the illegal trade in wild animals and the products from wild animals. 	<ul style="list-style-type: none"> • Biodiversity needs to be conserved. • Environmental problems are a threat to biodiversity. Some of these problems are overpopulation, deforestation and pollution. • Biodiversity is threatened by poaching, bush-meat consumption and the illegal trade in wild animals and products from wild animals. 	<ul style="list-style-type: none"> • Biodiversity needs to be conserved. • Environmental problems are a threat to biodiversity. Some of these problems are overpopulation, deforestation and pollution. • Biodiversity is threatened by poaching and illegal trade in wild animals and products from wild animals.

<p>Inputs</p>	<ul style="list-style-type: none"> • The Conservation Education Staff: 1 manager, 1 curriculum developer, 1 senior education officer, 2 education officers, 1 public engagement coordinator, 5 education interns, 1 Public Engagement assistant. • Funding from the NZG and NRF. • Lesson plans for various activities. • Learning support materials. • Information boards and signage at animal enclosures. • A Conservation Education Strategic Plan. • Conservation Education Policies. • A reporting framework. 	<ul style="list-style-type: none"> • Conservation Education Staff: 1 manager, 2 education officers, 24 guides. • Learning support materials. • A Conservation Education Strategic Plan that has been developed in collaboration with the Department of Education. • A reporting framework. • Brochures, fliers, booklets, posters and documentaries. 	<ul style="list-style-type: none"> • Conservation Education Staff: 1 education manager, 5 education officers, volunteers. • An education plan. • Standard operating procedures. • Printed educational materials. • Worksheets and workbooks. • Posters. • Teachers' kits. • A reporting framework.
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(b) The programme activities			
Conservation Education activities	<ul style="list-style-type: none"> • Five daily school lessons. • Seven themed programmes at different times of the year. • Nine different youth courses during the school holidays. • Three different outreach lessons. • Science shows. • Workshops for teachers. 	<ul style="list-style-type: none"> • Guided tours for all school groups visiting the zoo. • Tailor-made programmes on request by schools. • Programmes for the general public “keeper for a day”. • Interactive programmes aimed at creating awareness within the community about the value the wildlife biodiversity. 	<ul style="list-style-type: none"> • On-site Discovery programme. • Custom made programmes for schools on requests. • Outreach programmes. • Teachers’ workshops. • Lectures for tertiary students on request. • Courses, seminars and awareness-events for the general public.
Audiences	<ul style="list-style-type: none"> • School groups that book lessons. • School groups attending the daily zoo lessons. • Learners attending the youth courses during school holidays. • School groups attending science shows. • ZooClub members 	<ul style="list-style-type: none"> • School groups visiting the zoo. • School groups attending the outreach programmes. • General public visiting the zoo. • Communities attending the outreach programmes. 	<ul style="list-style-type: none"> • School groups attending the on-site Discovery programme. • School groups attending the outreach lessons. • Teachers attending the teachers’ workshops. • Tertiary students attending lectures on request. • The general public

	<p>attending different activities at the zoo.</p> <ul style="list-style-type: none"> • Teachers attending the teachers' workshops. • Tertiary students attending lectures on request. • The general public attending talks on conservation. • Conservation talks. 		attending courses and seminars.
(c) The desired programme results			
Outputs			
	<ul style="list-style-type: none"> • To increase knowledge about wild animals and their habitats. • To increase positive attitudes and pro-environmental behaviour. • To increase knowledge and skills in sciences. 	<ul style="list-style-type: none"> • To increase knowledge about wild animals and their habitats. • To increase positive attitudes towards wild animals and their habitats. • To increase pro-environmental behaviour. 	<ul style="list-style-type: none"> • To increase knowledge about wild animals and their habitats. • To increase positive attitudes about wild animals and their habitats. • To increase pro-environmental behaviour.
Outcomes			
<ul style="list-style-type: none"> • Short term outcomes 	<ul style="list-style-type: none"> • To increase learners' performance in Life Sciences at school. 	<ul style="list-style-type: none"> • To reduce poaching, the trade in wild animals and their products as well as 	<ul style="list-style-type: none"> • To provide a platform as an outdoor classroom. • To provide a resource

		bush-meat consumption. <ul style="list-style-type: none"> To reduce deforestation. 	centre for schools.
<ul style="list-style-type: none"> Long term outcomes 	<ul style="list-style-type: none"> To support quality teaching and learning in the life sciences. To increase the interest of learners to study Life Sciences at tertiary institutions. To reduce the poaching of endangered species like the rhinoceros. 	<ul style="list-style-type: none"> To conserve biodiversity. 	<ul style="list-style-type: none"> To create awareness on wildlife conservation and the environment.
Proposed Impact			
	<ul style="list-style-type: none"> To raise awareness in the community about nature and the environment and thus reduce their impact on nature and the environment. To promote environmental sustainability by changing behaviour. 	<ul style="list-style-type: none"> To change people's attitudes towards the environment in order to ensure a sustainable way of living. 	<ul style="list-style-type: none"> To play a role in the conservation of biodiversity and the environment.

(d) The evaluation study

Context

• Weaknesses

- | | | |
|---|---|--|
| <ul style="list-style-type: none">• Only some of the non-formal programmes are evaluated.• Time is a constraint in the evaluation of programmes.• Not enough emphasis put on Conservation Education.• The marketing of the Conservation Education programmes are not done well enough.• The Conservation Education programmes do not receive enough exposure in the media.• More educational resources are needed.• Financial support from management needs improvement.• The training of the course | <ul style="list-style-type: none">• Funding is the biggest challenge UWEC is facing.• The general public has a poor attitude towards environmental conservation due to poverty.• The evaluation of outreach programmes is a challenge due to a lack of funding.• Evaluation of on-site programmes needs improvement. | <ul style="list-style-type: none">• Not enough funding to change exhibits in order to modernize the zoo.• Teachers are negatively influenced to bring their learner to the zoo because of all the paperwork that they have to complete. |
|---|---|--|

	<p>presenters (zoo educators, students and interns) needs improvement.</p> <ul style="list-style-type: none"> • More emphasis is put on supporting Life Sciences teaching than the teaching of conservation issues. • There is no formal agreement with the Department of Education in place. • Ambassador animals are not used in the programmes. 		
<ul style="list-style-type: none"> • Strengths/Best Practices 	<ul style="list-style-type: none"> • Dedicated staff members. • Support on personal level from the management is good. • The Conservation Education programmes are linked to the school curriculum. • PAAZAB accreditation and 	<ul style="list-style-type: none"> • Conservation Education is seen as the main mandate of the zoo. • Ambassador animals are used in outreach programmes. • All school groups visiting the zoo are obliged to follow a programme. 	<ul style="list-style-type: none"> • One two hour long programme is offered to the school groups, namely the discovery programme. • A formal agreement between the zoo and the Department of Education is in place for the zoo to offer outreach

	<p>a member of WAZA.</p>	<ul style="list-style-type: none"> • Marketing is successful. • Although UWEC is not PAAZAB accredited, they are members of PAAZAB and WAZA. 	<p>programmes. These outreach programmes are funded by private companies like banks.</p> <ul style="list-style-type: none"> • All programmes are evaluated. • Marketing and branding is sufficient. • The Education Department has an art and creative centre, a resource centre, a training unit and a research unit. • Lessons are developed by means of teamwork and brainstorming sessions, also involving conservation staff. • Members of WAZA, South East Asia Zoo Association (SEAZA) and Malaysian Association of Zoological Parks and Aquaria (MAZPA).
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			<ul style="list-style-type: none"> • Staff training receives high priority. • All school groups visiting the zoo are encouraged to attend a programme • Ambassador animals are used in the programmes. • The zoo's focus is broad, and referred to as the "seven-in-one concept"
Implementation			
	<ul style="list-style-type: none"> • The outputs are achieved. • Short and long term outcomes are achieved. 	<ul style="list-style-type: none"> • The outputs are achieved. • Short and long term outcomes are achieved. 	<ul style="list-style-type: none"> • The outputs are achieved. • Short and long term outcomes are achieved
(e) Future plans/ opportunities			
	<ul style="list-style-type: none"> • The different roles within the department need to be aligned. • The evaluation and monitoring of all the Conservation Education activities and programme needs to be improved. • The teaching facilities 	<ul style="list-style-type: none"> • Changing education programmes to be more interactive. • Expand the outreach programmes. • Establishing a Conservation Education network in East Africa. 	<ul style="list-style-type: none"> • A botanical garden will be developed on the zoo's premises. • A zoo gallery with animal artefacts are in the process of being developed.

	(infrastructure) need improvement. <ul style="list-style-type: none"> The number of learners reached by the programmes should be increased. 		
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*For the purpose of this study the Conservation Education programmes were considered effective if there was a significant or a highly significant improvement in the number of correct responses.

The similarities and differences between the zoos, as indicated in Table 5.1, are discussed in section 5.3 below.

5.3 Conclusions

5.3.1 Conclusions of the quantitative study

How effective are the Conservation Education Programmes presented at the zoos in the three countries in increasing the learners' knowledge, and in bringing about changes in their attitudes and values about wildlife and wild places?

&

How do the Conservation Education Programmes of the NZG compare with those of other international zoos?

The NZG

The results obtained from the primary school data regarding the questions evaluating a change in knowledge indicated that no question indicated a significant improvement in the correct answers at the NZG. The results of the NZG obtained from the questions evaluating a change in values and attitudes indicated that there was also not a significant improvement in the number of correct answers for any of the questions. The initial pass-rates for the questions evaluating values and attitudes for the learners at the NZG, namely 75.63 %, 62.18 % and 55.46 % respectively, were all lower than those at the UWEC, namely 92.00 %, 90.67 % and 62.67 % respectively, as well as those at Zoo Negara, namely 83.67 %, 76,89 % and 64.54 % respectively. This indicates that prior knowledge may be a factor influencing the gaining of knowledge.

Based on the number of questions that showed a significant improvement in the number of correct answers, the conclusion could be made the Conservation Education programme for primary school learners at the NZG was not successful in changing the learners' knowledge, attitudes and values.

The results obtained from the secondary school data regarding the questions evaluating a change in knowledge, illustrated that there was a highly significant improvement in the number of correct answers indicated after the learners attended

the Conservation Education programme, in all the questions at the NZG, for all the questions evaluating a change of knowledge as well as for all the questions evaluating a change in values and attitudes. Based on the number of questions that showed a significant improvement in the number of correct answers, the conclusion can be made that the Conservation Education programme that the learners attended at the NZG was successful in changing the learners' knowledge, attitudes and values. All the secondary school learners at the NZG were from urban schools.

The UWEC

At the UWEC the results obtained from the primary school data regarding the questions evaluating a change in knowledge, indicated that two questions showed a significant improvement, and one question a highly significant improvement. With regard to the questions evaluating a change in values and attitudes, there was a significant improvement in the number of correct answers for one question. Although there was no significant change in the correct answers for questions 4 and 5 at the UWEC, the learners had high initial pass-rates of 92.00 % and 90.67%. Based on the number of questions that showed a significant improvement in the correct answers, the conclusion can be made that the Conservation Education programme that the learners attended at the UWEC was successful in changing the learners' knowledge, attitudes and values. At the UWEC 73.33% of the primary school learners came from rural schools.

For the secondary school groups at the UWEC there was a highly significant improvement in three questions and significant improvement in two questions testing an improvement in their knowledge. Based on the number of questions that showed a significant improvement in the number of correct answers, the conclusion can be made that the Conservation Education programme that the learners attended at the UWEC was successful in changing the learners' knowledge.

Regarding the questions evaluating a change in values and attitudes, at the UWEC there was a highly significant improvement in one question. Question 9 and 10 showed no significant improvement but these questions already had high pass-rates, both 96.34%. There was also no improvement in two questions which had a low initial pass-rate, namely questions 6 and 7. Based on the number of questions that showed a significant improvement in the number of correct answers, the conclusion

can be made that the Conservation Education programme that the learners attended at the UWEC was not successful in changing the learners' values and attitudes regarding two issues, namely that of the consumption of bush meat and the destruction of the habitats. The percentage of the learners that came from rural schools was 64.63.

Zoo Negara

At Zoo Negara the primary school results of the questions evaluating a change in knowledge indicated that one question had a highly significant improvement, one question showed no significant improvement, although this question had a high initial pass-rate. Question 2 for the primary schools, namely "*The Milky stork is found in the wild in Malaysia. True or False*" had a decrease in the number of correct responses, while a similar question was asked for the secondary school groups at the same zoo, namely question 5 "*The Milky stork is not found in the wild in Malaysia anymore.*" The secondary school groups had a highly significant improvement in the correct responses. An explanation for this can be that the zoo educator facilitating the primary school programme gave the learners the wrong information.

Although there was no significant improvement in the number of correct answers to all the questions regarding values and attitudes observed after the learners attended the Conservation Education programme at Zoo Negara for primary schools, these learners had a high initial pass-rate for all the questions, namely 89.47 %, 89.47 % and 85.96 % respectively. At Zoo Negara, 75.44 % of the primary school learners came from rural schools.

The results obtained at Zoo Negara for the questions evaluating a change in knowledge for the secondary school groups, indicated that one question had a significant improvement in the number of correct answers, and four questions showed a highly significant improvement. Regarding the questions evaluating a change in attitudes and values, one question had a significant improvement, while all the others indicated no significant improvement; however the initial pass-rates for these questions were already high. Based on the number of questions that showed a significant improvement in the number of correct answers, the conclusion can be made that the Conservation Education programme that the learners attended at the

Zoo Negara was successful in changing the learners' knowledge, attitudes and values. Of these learners, 80.61 % came from urban schools.

The study shows that when learners have high pass-rates prior to attending the programme, their pass-rates will not change significantly. This was the case in respect of knowledge, and values and attitudes.

As discussed above, there was a decrease in the number of correct responses in some instances. It is important that, in order to ensure the success of the Conservation Education programmes, the zoo educators bring across the messages that the programmes are intended to, and that the zoo educators are trained, and their skills and knowledge evaluated to ensure their capability. In Chapter 2 section 2.9 it was stated that Bettinger, et al. (2010:445) recommended that the training of the staff members is crucial, in order to ensure the success of Environmental Education programmes.

This study indicated that, except in the case of the primary school groups at the NZG, attending Conservation Education programmes increased the knowledge of the learners. As stated in Chapter 2 section 2.8, the researchers Johnson-Pynn and Johnson (2005:25) also reported a positive increase in the knowledge of conservation of the learners who attended the Conservation Education programmes. According to Jensen (2011:99), knowledge of animals and their habitats is the fundamental building-block for learning about wildlife conservation. As discussed in Chapter 2 section 2.2.2, the over-exploitation of the populations of wild species, mainly through the harvesting of animals and plants for food, material or medicine, at a rate above the reproductive capacity of the population, is one of the major threats to the survival of the biodiversity population (WWF, 2008:4; WWF, 2010:10), while species like the rhino and tigers are faced with extinction because of poaching and illegal trade (De Beer et al., 2005:6). Therefore, it can be concluded that zoos play an important role in the conservation of species and their habitats, through the Conservation Education programmes they present.

Both questions 8 and 10 of the secondary school questionnaire deal with the learners' intention to change their behaviour. As discussed in Chapter 3 section 3.2.2, one of the factors that influence behaviour changes, along with a person's upbringing or

social environment, is his/her belief in the ability that he/she can bring about change (Litchfield & Foster, 2009:6-8). Bamberg and Möser (2007:15) sees the intention to act and the objective situational factor as determining factors of pro-environmental behaviour, where *intention* is viewed as summarising the interplay of cognitive variables, namely action skills, knowledge of action strategies and issues, as well as personality variables, namely attitudes, locus of control, and personal responsibility (Bamberg & Möser, 2007:15).

In the case of the secondary schools, the results indicate that the Conservation Education programmes were successful in increasing the learners' intention to change behaviour. However, this study further indicated that although attending zoo Conservation Education programmes has the potential to increase the attitudes and values of learners, this was not always the case, for example, the primary school learners at the NZG showed no improvement in any question regarding attitudes and values. There was also no significant improvement in the secondary school learners at the UWEC with regard to the consumption of bush-meat and the destruction of the habitats both of which poses serious threats to the survival of species as discussed in Chapter 2 Section 2.2.2.

5.3.2 Conclusions of the qualitative study

- **How does the NZG's Conservation Educational programmes compare with those of other international zoos?**

The number of school learners who visited the NZG annually is more or less 140 000. The NZG has a total of 11 Conservation Education staff members. Approximately 180 000 school learners visit the UWEC annually. They have a total of 27 Conservation Education staff members. Approximately of 50 000 school learners visited Zoo Negara annually. This zoo has 6 Conservation Education staff members. The ratio of staff members to school learners at the NZG is less than both that of UWEC and Zoo Negara.

Zoo Negara puts a lot more effort into staff training than the NZG and the UWEC. At Zoo Negara all the programmes are evaluated, while only some are evaluated at the

NZG and the UWEC. Although it is the perception that the outputs and outcomes are achieved at the NZG, there is no physical evidence for that. There are indications that the outputs and outcomes are achieved at the UWEC through changes that are evident in the communities.

Zoo Negara and the UWEC have only one on-site programme, although both zoos will offer tailor-made lessons on request from schools. The NZG has five daily lessons and seven themed programmes that are offered at different times during the year.

The intended outputs of the Zoo Negara and the UWEC is that of increasing the learners' knowledge about wild animals and their habitats, and an increase in attitudes and pro-environmental behaviour. The NZG has an added intended output, namely that of the advancement of science amongst young learners.

What is the purpose of a zoo?

In line with the discussion in Chapter 2 Section 2.7, a zoo's function is that of conservation through the complete range of conservation activities, namely the *ex situ* breeding of endangered species, *in situ* conservation, research, Conservation Education and the changing of knowledge, attitudes and behaviour. However, the main purpose of a zoo is to link people with nature. This finding is in line with what was concluded in Chapter 2 section 2.9, namely that zoos serve this purpose in having an impact on its visitors to understand wildlife, its habitat, and the influence of humans on the natural world. Furthermore, the recreation role of zoos is important as a business in supplying the funding needed for the conservation role of zoos.

Is there a justification for the existence of zoos?

There is a greater need for zoos than ever before. Modern societies have become disassociated from nature and wildlife, and zoos are needed to restore the relationship between people, wildlife and their habitats, and in doing so, inspire them to change their attitudes and behaviour towards wildlife and wild places.

Zoos also have a very important role to play in the conservation of endangered species, both as genetic reservoirs of endangered species, and the re-introduction of species in their habitats.

5.4 A model for an effective zoo Conservation Education programme: Recommendations

The following recommendations are made to ensure the effectiveness of the Conservation Education programmes of zoos:

1. The Conservation Education programmes of zoos should address the threats to the biodiversity of the country or idealistically, the immediate location of the zoo, in order to ensure that the intended changes in the attitudes and behaviour occur where it matters. M2 stressed the fact that the issues that the Conservation Education programmes of UWEC are dealing with, are immediate, as indicated in section 4.3.2.2, while the same time, all three zoos that participated in this study, focused on the threats to biodiversity that their countries are facing, for example the illegal trade in wild animals and bush meat consumption, as indicated in sections 4.3.2.1 (a), 4.3.2.2 (a) and 4.3.2.3 (a).
2. Conservation Education programmes should reached across borders of countries, where the threat to the survival of a species extends across borders, for example trans-boundary conservation of chimpanzees and gorillas, as recommended by the zoo director D2 in section 4.3.2.2 (e), and also to combat the poaching of rhinoceroses in South Africa to supply the rhinoceroses horn market in the East, as discussed in section 2.2.2.
3. The development of the Conservation Education programmes should involve all the zoo educators of the particular zoo and by doing so, ensuring that these educators are becoming “owners” of the programme. This can be done by brainstorming sessions, involving all the zoo educators. Zoo Negara as well as

the UWEC see the development of their Conservation Education programmes in this way as a priority, as indicated in sections 4.3.2.2 and 4.3.2.3.

4. It makes it worthwhile for teachers to bring their learners to the zoo if the Conservation Education programmes are linked to the school curriculum. All three zoos that participated in this study, are linking their programmes to the school curriculum of their country, as indicated in sections 4.3.2.1 (d), 4.3.2.2 (d) and 4.3.2.3 (d).
5. A formal agreement between the zoo and the Education Department of the country for the zoo to offer certain programmes, also gives more creditability to these programmes. A formal agreement will strengthen the relationships between the formal and the non-formal education sectors, as was discussed in section 2.8. According to Knapp (2000:36-37), one of the strategies to attain the ultimate aim of Environmental Education, namely of changing environmental behaviour, is to combine formal Environmental Education programmes with non-formal programmes, and to strengthen relationships between the non-formal and the formal educator. Institutions like zoos and botanical gardens can play a big role in making this happen (Knapp, 2000:39). Zoo Negara has a formal agreement in place with the Department of Education, as indicated in section 4.3.2.3 (d).
6. All school learners visiting the zoo should have some kind of interaction with the Conservation Education staff. Zoo director D4 argued, as indicated in section 4.3.2.4 (a), that every learner that enters the zoo should be engaged in an educational programme. All learners visiting the UWEC are obliged to follow a programme, as indicated in section 4.3.2.2 (d), while at Zoo Negara, all learners are encouraged to follow a programme, as indicated in section 4.3.2.3 (d). In section 3.2.3 it was discussed that the Conservation Education programmes that form part of this study involve hands-on learning activities facilitated by a zoo educator, and that the pro-environmental behaviour change that is envisaged by these programmes by following methodologies that fall within the socio-constructivism and experiential learning perspectives.

Furthermore, zoo educators assist the learners' learning according to Vygotsky's social development theory. The abovementioned conclusion is similar to the findings of Jensen (2011:96-97) who came to the conclusion that the assimilation of new ideas into a learner's existing mental map (for understanding animals and habitats) can be significantly enhanced through assistance from a *more knowledgeable other*, (in this case the zoo educator), as discussed in section 3.2.2.

7. The Conservation Education programmes should be interactive and should include interaction with live animals. The UWEC as well as Zoo Negara are using ambassador animals in their programmes, as indicated in section 4.3.2.2 (d) and 4.3.2.3 (d). This also is similar to the findings of Jensen, (2011:100), West and Dickie, (2007:5-6) and Packer, et al., (2010:15), as stated section 2.7. In section 2.8 Jensen's (2011:94) findings were that viewing live animals can have a powerful impact on learners to construct a new understanding of wildlife, the natural world, and the role of humans intervening in this natural world and that this this impact can be increased by the zoo's educational interventions.
8. More funding should go towards education in a zoo, both for educational resources, and for more education staff. The lack of funds was a weakness at all three zoos participating in this study, as was indicated in sections 4.3.2.1 (d), 4.3.2.2 (d) and 4.3.2.3 (d). Furthermore, zoo director D4 argued that zoos need to put more money into education, as was indicated in section 4.3.2.4 (a).
9. The evaluation of Conservation Education programmes should be improved. These findings are in line with what was mentioned in Chapter 2 section 2.9, where it was stated that the desired change in knowledge, attitudes and behaviour will be measurable the thorough evaluation, and that evaluation is often not done due to a lack of skills, money and time.
10. Conservation Education programmes should inspire the learners to practice environmental conservation, as was recommended by D7 in 4.3.2.4(a).

11. The training of the zoo educators in respect of the programmes that they are facilitating is very important to ensure the success of the programmes. The need for better training of zoo educators was emphasised by staff members at the NZG as indicated in section 4.3.2.1 (d), while the training of zoo educators is a priority at Zoo Negara, as indicated in section 4.3.2.3 (d).

5.5 Suggestions for further research

This study focused on school groups visiting the zoos and attending a structured non-formal programme, and not programmes that are of a longer nature, for example the ZooClub of the NZG, which runs over a number of years. It is suggested that longer-term Conservation Education programmes should be evaluated in order to determine the effect it may have on the gaining of knowledge and increasing the learners' attitudes and values about wildlife and wild places.

5.6 Conclusion

In this chapter the conclusions of the study have been made. The findings of the study are summarised in table form. Thereafter, the different research questions are addressed. Recommendations are suggested towards an effective Conservation Education Model for zoos and lastly, suggestions for further research are made.

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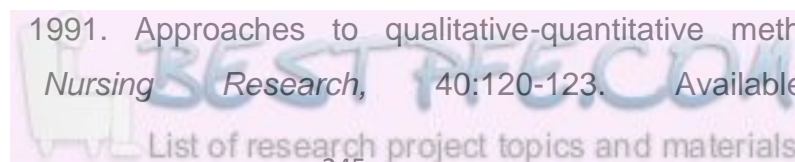
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APPENDIX A

The Primary School Questionnaire, implemented at the UWEC

Questionnaire 1

On-site programme: Endangered-animals Guided Tour UWEC

Uganda: Primary Schools (Higher Primary Level)

Choose 'true' or 'false' by making a cross (x) in the relevant block.

1. Chimpanzees are threatened animals.

True	<input type="checkbox"/>	False	<input type="checkbox"/>
------	--------------------------	-------	--------------------------

2. Rhinoceroses are found in the wild in Uganda.

True	<input type="checkbox"/>	False	<input type="checkbox"/>
------	--------------------------	-------	--------------------------

3. Wild animals make good pets.

True	<input checked="" type="checkbox"/>	False	<input type="checkbox"/>
------	-------------------------------------	-------	--------------------------

4. It is good to eat threatened wild animals.

True	<input checked="" type="checkbox"/>	False	<input type="checkbox"/>
------	-------------------------------------	-------	--------------------------

5. I want to help to protect wild animals.

True	<input checked="" type="checkbox"/>	False	<input type="checkbox"/>
------	-------------------------------------	-------	--------------------------

6. Littering harms the ecosystem.

True	<input type="checkbox"/>	False	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX B

The Secondary School Questionnaire, implemented at the UWEC

Questionnaire 2

On-site programme: Endangered-animals Guided Tour

UWEC

Uganda: Secondary Ordinary Level

Instructions: Read the statements below and make a cross (x) in the column stating whether you strongly agree, agree, are not sure, disagree or strongly disagree with the statement.

Statement	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
1. Chimpanzees are endangered due to poaching, the consumption of 'bush meat', the pet trade, and habitat destruction.					
2. A chimpanzee's DNA is about 98 % similar to a human's DNA.					
3. The pet trade is a threat to the survival of tortoises and terrapins.					
4. Rhinoceroses are poached for their horns.					
5. Rhinoceroses are not found in the wild in Uganda anymore.					
6. Eating endangered wild animals is wrong.					
7. I think we must accept the responsibility for the destruction of the habitats of animals.					
8. I can play a role in conserving chimpanzees.					
9. I believe that all living creatures are important.					
10. I want to get involved in projects to protect animals and their habitats.					

APPENDIX C

The Primary School Questionnaire, implemented at the NZG

Questionnaire 1

National Zoological Gardens of South Africa

Programme: Endangered-animals Guided Tour

Grade 7

Choose 'true' or 'false' by making a cross (x) in the relevant block.

1. Chimpanzees are threatened animals.

True	<input type="checkbox"/>	False	<input type="checkbox"/>
------	--------------------------	-------	--------------------------

2. Rhinoceroses are poached for their horns.

True	<input type="checkbox"/>	False	<input type="checkbox"/>
------	--------------------------	-------	--------------------------

3. Wild animals make good pets.

True	<input type="checkbox"/>	False	<input type="checkbox"/>
------	--------------------------	-------	--------------------------

4. It is good to eat threatened wild animals.

True	<input type="checkbox"/>	False	<input type="checkbox"/>
------	--------------------------	-------	--------------------------

5. I want to help to protect wild animals.

True	<input type="checkbox"/>	False	<input type="checkbox"/>
------	--------------------------	-------	--------------------------

6. Littering harms the ecosystem.

True	<input type="checkbox"/>	False	<input type="checkbox"/>
------	--------------------------	-------	--------------------------

APPENDIX D

The Secondary School Questionnaire, implemented at the NZG

Questionnaire 2

National Zoological Gardens of South Africa

On-site programme: Endangered-animals Guided Tour

Secondary School - Grades 10

Instructions: Read the statements and make a cross (x) in the column stating whether you strongly agree, agree, are not sure, disagree or strongly disagree with the statement.

Statement	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
1. Chimpanzees are endangered due to poaching, the consumption of 'bush meat', the pet trade, and habitat destruction.					
2. A chimpanzee's DNA is about 98 % similar to a human's DNA.					
3. The pet trade is a threat to the survival of tortoises and terrapins.					
4. Rhinoceroses are poached for their horns.					
5. Rhinoceroses' horns have no medicinal value.					
6. Eating endangered wild animals is wrong.					
7. I think we must accept the responsibility for the destruction of the habitats of animals.					
8. I can play a role in conserving rhinoceroses.					
9. I believe that all living creatures are important.					
10. I want to get involved in projects to protect animals and their habitats.					

APPENDIX E

The Primary School Questionnaire, implemented at Zoo Negara

Questionnaire 1

Zoo Negara, Malaysia

On-site programme: Discovery programme

Malaysia: Grade 7 (Primary Level 2)

Choose 'yes' or 'no' by making a cross (x) in the relevant block.

1. Asian elephants are threatened animals.

Yes		No	
-----	--	----	--

2. Milky stork are found in the wild in Malaysia.

Yes		No	
-----	--	----	--

3. Wild animals make good pets.

Yes		No	
-----	--	----	--

4. It is good to eat threatened wild animals.

Yes		No	
-----	--	----	--

5. I want to help to protect wild animals.

Yes		No	
-----	--	----	--

6. Littering harms the ecosystem.

Yes		No	

APPENDIX F

The Secondary School Questionnaire, implemented at Zoo Negara

Zoo Negara

Questionnaire 2

On-site programme: Discovery programme

Secondary School - Grade 10

Instructions: Read the statement and make a cross (x) in the column to indicate whether you strongly agree, agree, are not sure, disagree or strongly disagree with the statement.

Statement	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
1. Orangutans are endangered due to poaching, the consumption of 'bush meat', the pet trade and habitat destruction.					
2. A chimpanzee's DNA is about 98,8% similar to a human's DNA.					
3. The pet trade is a threat to the survival of tortoises and terrapins.					
4. The Malayan tigers are poached for their meat, bones and skin.					
5. The Milky Stork are not found in the wild in Malaysia anymore.					
6. Eating endangered wild animals is wrong.					
7. I think we must accept the responsibility for the destruction of the habitats of animals.					
8. I can play a role in conserving the Malayan Tigers.					
9. I believe that all living creatures are important.					
10. I want to get involved in projects to protect animals and their habitats.					

APPENDIX G

The interview questions: Position - Executive/Managing Director

1. What, according to you, is the main purpose of a zoo?
2. How does this zoo compare to other international zoos in respect of complying with WAZA's World Zoo Conservation Strategy?
3. What campaigns/projects does this zoo have with the aim of conserving endangered species and the ecosystem? Who are these campaigns aimed at? What does it involve?
4. Do these campaigns/projects achieve what they are intended for?
5. Have you managed to return any animals to their natural habitat?
6. Do you think that zoos are, in fact, contributing to the conservation of the endangered species?
7. How do you see the role of zoos and aquariums in terms of
 - a. research?
 - b. conservation?
 - c. education?
 - d. recreation?
8. Does the zoo have PAZAAB accreditation?
9. What do you think is the biggest limitation in zoos in Africa in complying with PAZAAB standards?
10. Does the zoo have an animal-collection plan?
11. Do you think that zoos serve the best interests of the animals?

12. What is the fundamental intended or unintended change you want to see the zoo achieving in the communities in 7 – 10 years' time as a result of the programmes?
13. What are the specific changes in the participants' in the programmes' behaviour, knowledge, skills, status and level of functioning (outcomes) that you envisage, as regards the following:
 - short-term outcomes (attainable within 1-3 years); and
 - long-term outcomes (achievable within 4-6 years)?
14. Are you achieving these short-term and long-term outcomes? How, and how do you know it?
15. What are your plans for Conservation Education in the future?
16. What is your opinion on the existence of zoos and aquariums in modern society?

APPENDIX H

The interview questions: Position - Education Manager

1. What is, according to you, the main purpose of a zoo?
2. How many visitors to you have annually?
3. How many of them are learners from the local schools?
4. How does this zoo compare to other international zoos as far as complying with WAZA's World Zoo Conservation Strategy is concerned?
5. Do you think that zoos are, in fact, contributing to the conservation of endangered species?
6. How do you see the role of zoos and aquariums in terms of
 - a. research, by making use of the animal collection?
 - b. conservation?
 - c. education?
 - d. recreation?
7. Does the zoo have PAZAAB accreditation?
8. What do you think is the biggest limitation in zoos in Africa in complying with PAZAAB standards?
9. Is the zoo involved in research projects (scientific or social studies)? Explain.
10. Does the zoo have an animal-collection plan?
11. Do you think that zoos serve the best interests of the animals?
12. What is the zoo's vision statement?

13. What is the fundamental intended or unintended change you would like to see zoos achieving in 7-10 years' time in the communities as a result of education programme activities?
14. What are the specific changes in the participants' (learners') in the programmes' behaviour, knowledge, skills, status and level of functioning (outcomes) you envisage, namely
 - short-term outcomes, attainable within 1 – 3 years; and
 - long-term outcomes, achievable within 4 – 6 years?
15. Are you achieving these short-term and long-term outcomes? How, and how do you know this?
16. What programmes do you offer?
17. What are the objectives/outcomes/aims of these programmes?
18. Where are you situated currently in respect of achieving these objectives/outcomes/aims?
19. What strategies do you have in place to achieve these objectives/outcomes/aims?
20. Do the Conservation Education programmes of the zoo achieve what they are intended for?
21. Are the outputs (goals/objectives) being achieved?
22. Do the programmes make a difference in the community?
23. Do you evaluate the impact of your Conservation Education programmes on public interface level? How?
24. Do you evaluate the impact of your structured, non-formal Conservation Education programmes? How?

25. Are the Conservation Education programmes worthwhile, in terms of
 - the cost?
 - input?
 - results?
26. Are the education programmes sustainable in terms of
 - the support it receives from your management? How?
 - the follow-up made? How?
 - the updating of information? How?
 - the administration applied? How?
27. What kind of exposure do you get?
28. Are the programmes in line with the requirements of the zoo's social responsibility?
29. Do the programmes provide marketing possibilities for the zoo?
30. Do the programmes improve the zoo's image?
31. Is the zoo's name visible at the launches, workshops and certificate ceremonies?
32. Why should your programmes be supported by the government /funding/ public?
33. Are the presenters (zoo educators and volunteers) able to manage, present and develop the programmes well? How do you know that?
34. How do you know that the content of the programmes are clear to the learners?

35. How do you ensure that the quality of the learning support material used for the programmes is of good standard?
36. Do the programmes provide sufficient resources?
37. Do the programmes include satisfaction surveys?
38. Do the presenters supply regular reports?
39. Do the programmes prove to be worthwhile in terms of money spent on them?
40. Do you give support to the teachers?
41. How do you give this support?
42. Is the impact of your structured, non-formal education programmes evaluated? How?
43. Is the impact of the free-choice learning evaluated? How?
44. Does the zoo have a written education policy?
45. Does the zoo have an education strategic plan?
46. What are your plans for Conservation Education in the future?
47. What is your opinion on the existence of zoos and aquariums in modern society?

APPENDIX I

The interview questions: Position - Zoo Educator

1. How many species/animals are kept at the zoo?
2. How many visitors to you have annually?
3. How many of them are learners from the local schools?
4. What is, according to you, the main purpose of a zoo?
5. Do you think that zoos are, in fact, contributing to the conservation of endangered species? Why/how?
6. Do you think that zoos serve the best interests of the animals?
7. What is this zoo's vision statement?
8. What is the fundamental intended or unintended change you want to see the zoo achieving in 7-10 years' time in the communities as a result of the education programme activities?
9. What are the specific changes in the programmes' participants' (learners') behaviour, knowledge, skills, status and level of functioning (outcomes) you envisage, in respect of
 - short-term outcomes, attainable within 1-3 years; and
 - long-term outcomes, achievable within 4 – 6 years?
11. Are you achieving these outcomes? How? How do you know this?
12. What programmes do you offer?
13. What are the objectives/outcomes/aims of these programmes?
14. Does the Conservation Education programmes at the zoo achieve what they are intended for?

15. Do you evaluate the impact of your structured non-formal Conservation Education programmes? How?
16. Are the Conservation Education programmes worthwhile in terms of the
 - costs?
 - input?
 - results?
17. Are the education programmes sustainable in terms of
 - the support it receives from your management? How?
 - the follow-up made? How?
 - the updating of information? How?
 - the administration applied? How?
18. What exposure do you get?
19. Are the programmes in line with the requirements of the zoo's social responsibility?
20. Is the zoo's name visible at the launches, workshops, certificate ceremonies of the programmes?
21. Why should your programmes be supported by the government /funding/ public?
22. Are the presenters (zoo educators and volunteers) able to manage, present and develop the programmes well? How do you know that?
23. How do you know that the content of the programmes are clear to the learners?

24. How do you ensure that the quality of the learning support material used for the programmes is of a good standard?
25. Does the programme provide sufficient resources?
26. Does the programme include satisfaction surveys?
27. Do the presenters supply regular reports?
28. Do the programmes prove to be worthwhile in terms of the money spent on them?
29. Do you give support to the teachers?
30. How do you give this support?
31. Is the impact of your structured non-formal education programmes evaluated? How?
32. Is the impact of free-choice learning evaluated? How?
33. Does the zoo have a written education policy?
33. Does the zoo have an education strategic plan?
34. What are your plans for Conservation Education in the future?
35. What is your opinion on the existence of zoos and aquariums in modern society?

APPENDIX J

The interview questions: Other key Individuals in the zoo/conservation environment

1. What, according to you, is the main purpose of a zoo?
2. How does this zoo compare to other international zoos in respect of complying with WAZA's World Zoo Conservation Strategy?
3. What campaigns/projects does the zoo have with the aim of conserving endangered species and the ecosystem? Who are these campaigns aimed at? What does it involve?
4. Do these campaigns/projects achieve what they are intended for?
5. Have you managed to return any animals to their natural habitat?
6. Do you think that zoos are, in fact, contributing to the conservation of endangered species?
7. How do you see the role of zoos and aquariums in terms of
 - a. research?
 - b. conservation?
 - c. education?
 - d. recreation?
8. Does the zoo have PAZAAB accreditation?
9. What do you think is the biggest limitation in zoos in Africa in complying with PAZAAB standards?
10. Does the zoo have an animal-collection plan?
11. Do you think that zoos serve the best interests of the animals?

12. What is the fundamental intended or unintended change you want to see the zoos achieving in the communities in 7-10 years' time as a result of the education programme activities?
13. What are the specific changes in the participants in the programmes' behaviour, knowledge, skills, status and level of functioning (outcomes) you envisage, in respect of
 - short-term outcomes (attainable within 1-3 years); and
 - long-term outcomes (achievable within 4-6 years)?
14. Are you achieving these outcomes? How? How do you know this?
15. What are your plans for Conservation Education in the future?
16. What is your opinion on the existence of zoos and aquariums in modern society?

APPENDIX K

The consent form: individual interviews

Title of the project:

A Comparative Evaluation of Educational Programmes At Zoological Institutions in Three Countries

Investigator

This study will be conducted by Elize de Jager, a staff member at the National Zoological Gardens of South Africa, P.O. Box 754, Pretoria, 0001.

Invitation to participate, and purpose

You are hereby invited to participate in the evaluation of the Conservation Education programmes of the National Zoological Gardens of South Africa/Zoo Negara/UWEC. Thank you for taking the time out of your busy schedule to consider participating.

Aim of the study

The aim of the study is to comparatively evaluate the Conservation Educational programmes of the National Zoological Gardens of South Africa, UWEC and Zoo Negara.

The objectives of the study are

- to evaluate the effectiveness of Conservation Education programmes of zoological gardens in three countries in increasing the knowledge, attitudes and values about wildlife and wild places;
- to benchmark the Conservation Education programmes of the NZG against other international zoological gardens;
- to establish criteria for the successful Conservation Education programmes.

Voluntary participation

Your participation in this interview is completely voluntary, and you may withdraw your participation at any time during the process. If you choose to do so, any information derived from your participation will be deleted from the findings.

Ethical approval

Ethical approval was given by the National Zoological Gardens of South Africa, as well as from the University of South Africa to conduct this study.

Methods/Procedures

The method of data collection for this study will be individual interviews. The sessions will be audio-recorded, and the recordings transcribed to ensure the accurate reporting of the information that you provide. The transcribers will sign a form stating that they will not discuss any item on the tape with anyone other than the researchers. No one's name will be asked in the individual interviews. However, should another participant call you by your name, the transcriber will be instructed to remove all names from the transcription. The audio-recordings will be stored in a secure way before and after the transcription.

Confidentiality

If you choose to participate, you will not be asked your name during the individual interview. You will not need to use your name in the individual interview. If by chance, you or someone else addresses you by name in the sessions, the transcriber will be instructed to delete all names from the transcription. The results of this study are to be used by the researcher only.

No names will, however, be attached to the recordings or transcriptions, nor used in any written report or publications which result from this evaluation project. Your participation will be strictly confidential.

Direct quotes may be used to more clearly capture the meanings in reporting the findings.

Risks and Inconveniences

There are no anticipated physical risks to the participants.

Compensation

No compensation will be given.

Summary of the findings/debriefing

A debriefing session will take place after the completion of the individual interviews.

Thank you for participating in this study!

A handwritten signature in black ink, appearing to read 'Elize de Jager'.

Elize de Jager

Curriculum Developer and Head: Life Sciences Centre

Department of Conservation Education and Public

Engagement in Science

e-mail: elize@nzg.ac.za

Cell-phone number: +27 82 449 9249

Please initial the box:

1. I confirm that I have read and that I understand the information sheet for the above study and have had the opportunity to ask questions.
2. I understand that my participation is voluntary, and that I am free to withdraw at any time, without giving a reason.
3. I agree to take part in the above study.
4. I agree to the interview being audio-recorded.
5. I agree to the use of anonymous quotes in publications.

<hr/>		
Name of participant	Date	Signature
Elize de Jager		
<hr/>		
Name of researcher	Date	Signature

APPENDIX L

The consent form: group-administered questionnaires

Title of the project:

A Comparative Evaluation of Educational Programmes At Zoological Institutions in Three Countries

Investigator.

This study will be conducted by Elize de Jager, a staff member at the National Zoological Gardens of South Africa, P.O. Box 754, Pretoria, 0001.

Invitation to participate, and purpose

Your child has been invited to participate in the evaluation of the education programmes of the National Zoological Gardens of South Africa, Zoo Negara and UWEC. Thank you for taking the time out of your busy schedule to consider your child's participation.

Aim of the study

The aim of the study is to comparatively evaluate the Conservation Educational programmes of the National Zoological Gardens of South Africa, UWEC and Zoo Negara.

The objectives of the study are:

- to evaluate the effectiveness of the Conservation Education programmes of zoological gardens in three countries in increasing knowledge, attitudes and values about wildlife and wild places;
- to benchmark the Conservation Education programmes of the NZG against other international zoological gardens;
- to establish criteria for successful Conservation Education programmes.

Voluntary participation

You may withdraw your assent to let your child participate at any time during the research process. If you choose to do so, any information derived from your child's participation will be deleted from the findings. Your child will be requested to sign a consent form. Please discuss this form with your child.

Methods/Procedures

The methods of data collection for this study will be the completion of pre- and post-questionnaires by learners attending zoo educational programmes. The name of the educator, the learner or the school will not be revealed. It will take your child only a couple of minutes before and after attending the zoo programme to complete the questionnaire. Six to ten questions will be asked. You may ask to see the questionnaire before giving your assent. The questions asked during the interviews and in the questionnaires will be only to evaluate the impact of the educational programmes with regard to learners' knowledge, attitudes and values in connection with conservation and the environment. No sensitive or emotionally-disturbing questions will be asked nor any personal questions.

Ethical approval

Ethical approval was given by the National Zoological Gardens of South Africa, as well as by the University of South Africa to conduct this study.

Confidentiality

The results of this research are to be used by the researcher only this study. No names, either of the participant or of the school will be revealed.

Risks and Inconveniences

There are no anticipated physical risks to the participants.

Compensation

No compensation will be given to the participating educators, the learners or the school.

Thank you for allowing your child to complete the questionnaire!

A handwritten signature in black ink, appearing to read 'Elize de Jager'.

Elize de Jager

Curriculum Developer and Head: Life Sciences Centre

Department of Conservation Education and Public Engagement in Science

e-mail: elize@nzg.ac.za

Cell-phone number: +27 82 449 92

Please initial the box:

- 1. I confirm that I have read and that I understand the information sheet for the above study, and have had the opportunity to ask questions.

- 2. I understand that my child's participation is voluntary and that he/she is free to withdraw at any time, without giving a reason.

- 3. I agree that my child may take part in the above study.

- 4. I agree that my child may complete the questionnaire.

- 5. I understand that the findings of this study may be published.

Name of parent **Date** **Signature**

Name of school **Name of child**

Elize de Jager

Name of researcher **Date** **Signature**



APPENDIX M

The child assent form

Dear Learner

I am currently working towards the completion of a Doctor's degree at the University of South Africa. I am undertaking a research study to determine the success of zoo programmes. The results of this study will be used to improve the educational programmes that zoos and aquariums offer.

I would appreciate it if you would participate in this project. It will take only a few minutes of your time. You will be asked to complete a questionnaire of 6 to 10 questions before and after you have attended the lesson at the zoo or aquarium. Your name, your teacher's name and the name of your school will not be revealed. The data that I collect will be kept confidential.

Your participation in this study is completely voluntarily. You are welcome not to participate if you prefer not to. You may also withdraw at any stage.

There are no anticipated risks associated with this study. The results of this study will enable me to adjust my teaching methods so that I can make your educational experience the best that it can be.

Please discuss this form with your teacher, parent or guardian before signing it. Your teacher or parent will also be asked to give their permission for you to participate in this study. They will also receive a copy of this form.

Please feel free to ask any question about this study at any time. You will find my e-mail address and cell-phone number at the bottom of this form.

Your participation will be greatly appreciated.

Yours sincerely,

Ms. E. de Jager

Cell-phone number: +27 82 4499 249; e-mail: elize@nzg.ac.za

Please sign below if you give your consent to being part of the research project described above.

Name of learner: _____

Signature of learner: _____

Date: _____

APPENDIX N

The results of the McNemar test

PRIMARY SCHOOLS

McNemar tests ALL:

```
> new <- na.omit(dat1);
> # 251 pre 251 post
>
> # select PRE POST
> pre <- new[new$Test=="Pre",];
> post <- new[new$Test=="Post",];
>
> table(pre$Q1.R,post$Q1.R, dnn=c("Pre", "Post"));
      Post
Pre    Correct Wrong
Correct  157   17
Wrong    44   33
> mcnemar.test(pre$Q1.R,post$Q1.R);
```

McNemar's Chi-squared test with continuity correction

data: pre\$Q1.R and post\$Q1.R
McNemar's chi-squared = 11.082, df = 1, p-value = 0.0008717

```
>
> table(pre$Q2.R,post$Q2.R, dnn=c("Pre", "Post"));
      Post
Pre    Correct Wrong
Correct   88   46
Wrong    52   65
> mcnemar.test(pre$Q2.R,post$Q2.R);
```

McNemar's Chi-squared test with continuity correction

data: pre\$Q2.R and post\$Q2.R
McNemar's chi-squared = 0.2551, df = 1, p-value = 0.6135

```
>
> table(pre$Q3.R,post$Q3.R, dnn=c("Pre", "Post"));
      Post
Pre    Correct Wrong
Correct  126   28
Wrong    57   40
> mcnemar.test(pre$Q3.R,post$Q3.R);
```

McNemar's Chi-squared test with continuity correction

data: pre\$Q3.R and post\$Q3.R
McNemar's chi-squared = 9.2235, df = 1, p-value = 0.002389

```
>
> table(pre$Q4.R,post$Q4.R, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  181   29
Wrong   28   13
> mcnemar.test(pre$Q4.R,post$Q4.R);
```

McNemar's Chi-squared test with continuity correction

data: pre\$Q4.R and post\$Q4.R
McNemar's chi-squared = 0, df = 1, p-value = 1

```
>
> table(pre$Q5.R,post$Q5.R, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  174   19
Wrong   22   36
> mcnemar.test(pre$Q5.R,post$Q5.R);
```

McNemar's Chi-squared test with continuity correction

data: pre\$Q5.R and post\$Q5.R
McNemar's chi-squared = 0.0976, df = 1, p-value = 0.7548

```
>
> table(pre$Q6.R,post$Q6.R, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  135   27
Wrong   43   46
> mcnemar.test(pre$Q6.R,post$Q6.R);
```

McNemar's Chi-squared test with continuity correction

data: pre\$Q6.R and post\$Q6.R
McNemar's chi-squared = 3.2143, df = 1, p-value = 0.073

```
>
```

McNemar tests by school:

```
> # select place
```

```

> pre1 <- pre[pre$Questionnaire=="NZG",];
> pre2 <- pre[pre$Questionnaire=="UWEC",];
> pre3 <- pre[pre$Questionnaire=="ZOO NEGARA",];
>
> post1 <- post[post$Questionnaire=="NZG",];
> post2 <- post[post$Questionnaire=="UWEC",];
> post3 <- post[post$Questionnaire=="ZOO NEGARA",];
>
>
> # NZG
> table(pre1$Q1.R,post1$Q1.R, dnn=c("Pre", "Post"));
      Post
Pre    Correct Wrong
Correct  58   13
Wrong   25   23
> mcnemar.test(pre1$Q1.R,post1$Q1.R);

```

McNemar's Chi-squared test with continuity correction

data: pre1\$Q1.R and post1\$Q1.R
 McNemar's chi-squared = 3.1842, df = 1, p-value = 0.07435

```

>
> table(pre1$Q2.R,post1$Q2.R, dnn=c("Pre", "Post"));
      Post
Pre    Correct Wrong
Correct  63   11
Wrong   20   25
> mcnemar.test(pre1$Q2.R,post1$Q2.R);

```

McNemar's Chi-squared test with continuity correction

data: pre1\$Q2.R and post1\$Q2.R
 McNemar's chi-squared = 2.0645, df = 1, p-value = 0.1508

```

>
> table(pre1$Q3.R,post1$Q3.R, dnn=c("Pre", "Post"));
      Post
Pre    Correct Wrong
Correct  59   21
Wrong   17   22
> mcnemar.test(pre1$Q3.R,post1$Q3.R);

```

McNemar's Chi-squared test with continuity correction

data: pre1\$Q3.R and post1\$Q3.R
 McNemar's chi-squared = 0.2368, df = 1, p-value = 0.6265

```

>

```



```
> table(pre1$Q4.R,post1$Q4.R, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  68   22
Wrong   16   13
> mcnemar.test(pre1$Q4.R,post1$Q4.R);
```

McNemar's Chi-squared test with continuity correction

data: pre1\$Q4.R and post1\$Q4.R
 McNemar's chi-squared = 0.6579, df = 1, p-value = 0.4173

```
>
> table(pre1$Q5.R,post1$Q5.R, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  61   13
Wrong   12   33
> mcnemar.test(pre1$Q5.R,post1$Q5.R);
```

McNemar's Chi-squared test with continuity correction

data: pre1\$Q5.R and post1\$Q5.R
 McNemar's chi-squared = 0, df = 1, p-value = 1

```
>
> table(pre1$Q6.R,post1$Q6.R, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  47   19
Wrong   19   34
> mcnemar.test(pre1$Q6.R,post1$Q6.R);
```

McNemar's Chi-squared test

data: pre1\$Q6.R and post1\$Q6.R
 McNemar's chi-squared = 0, df = 1, p-value = 1

```
>
>
> # UWEC
> table(pre2$Q1.R,post2$Q1.R, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  57    1
Wrong   10    7
> mcnemar.test(pre2$Q1.R,post2$Q1.R);
```

McNemar's Chi-squared test with continuity correction

data: pre2\$Q1.R and post2\$Q1.R
McNemar's chi-squared = 5.8182, df = 1, p-value = 0.01586

```
>  
> table(pre2$Q2.R,post2$Q2.R, dnn=c("Pre", "Post"));  
      Post  
Pre   Correct Wrong  
Correct  12    11  
Wrong   25    27  
> mcnemar.test(pre2$Q2.R,post2$Q2.R);
```

McNemar's Chi-squared test with continuity correction

data: pre2\$Q2.R and post2\$Q2.R
McNemar's chi-squared = 4.6944, df = 1, p-value = 0.03026

```
>  
> table(pre2$Q3.R,post2$Q3.R, dnn=c("Pre", "Post"));  
      Post  
Pre   Correct Wrong  
Correct  34     4  
Wrong   25    12  
> mcnemar.test(pre2$Q3.R,post2$Q3.R);
```

McNemar's Chi-squared test with continuity correction

data: pre2\$Q3.R and post2\$Q3.R
McNemar's chi-squared = 13.7931, df = 1, p-value = 0.0002041

```
>  
> table(pre2$Q4.R,post2$Q4.R, dnn=c("Pre", "Post"));  
      Post  
Pre   Correct Wrong  
Correct  64     5  
Wrong    6     0  
> mcnemar.test(pre2$Q4.R,post2$Q4.R);
```

McNemar's Chi-squared test with continuity correction

data: pre2\$Q4.R and post2\$Q4.R
McNemar's chi-squared = 0, df = 1, p-value = 1

```
>  
> table(pre2$Q5.R,post2$Q5.R, dnn=c("Pre", "Post"));  
      Post  
Pre   Correct Wrong  
Correct  64     4  
Wrong    6     1
```

```
> mcnemar.test(pre2$Q5.R,post2$Q5.R);
```

McNemar's Chi-squared test with continuity correction

data: pre2\$Q5.R and post2\$Q5.R

McNemar's chi-squared = 0.1, df = 1, p-value = 0.7518

```
>
```

```
> table(pre2$Q6.R,post2$Q6.R, dnn=c("Pre", "Post"));
```

```
      Post
Pre   Correct Wrong
Correct  44     3
Wrong   17    11
```

```
> mcnemar.test(pre2$Q6.R,post2$Q6.R);
```

McNemar's Chi-squared test with continuity correction

data: pre2\$Q6.R and post2\$Q6.R

McNemar's chi-squared = 8.45, df = 1, p-value = 0.00365

```
>
```

```
> # ZOO NAGARA
```

```
> table(pre3$Q1.R,post3$Q1.R, dnn=c("Pre", "Post"));
```

```
      Post
Pre   Correct Wrong
Correct  42     3
Wrong    9     3
```

```
> mcnemar.test(pre3$Q1.R,post3$Q1.R);
```

McNemar's Chi-squared test with continuity correction

data: pre3\$Q1.R and post3\$Q1.R

McNemar's chi-squared = 2.0833, df = 1, p-value = 0.1489

```
>
```

```
> table(pre3$Q2.R,post3$Q2.R, dnn=c("Pre", "Post"));
```

```
      Post
Pre   Correct Wrong
Correct  13    24
Wrong    7    13
```

```
> mcnemar.test(pre3$Q2.R,post3$Q2.R);
```

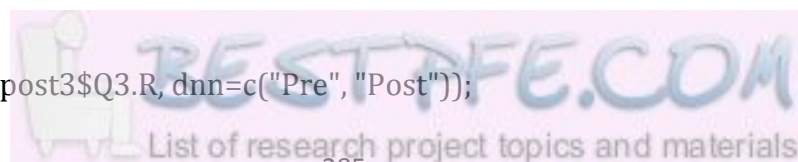
McNemar's Chi-squared test with continuity correction

data: pre3\$Q2.R and post3\$Q2.R

McNemar's chi-squared = 8.2581, df = 1, p-value = 0.004057

```
>
```

```
> table(pre3$Q3.R,post3$Q3.R, dnn=c("Pre", "Post"));
```



```

      Post
Pre   Correct Wrong
Correct  33   3
Wrong   15   6
> mcnemar.test(pre3$Q3.R,post3$Q3.R);

```

McNemar's Chi-squared test with continuity correction

```

data: pre3$Q3.R and post3$Q3.R
McNemar's chi-squared = 6.7222, df = 1, p-value = 0.009522

```

```

>
> table(pre3$Q4.R,post3$Q4.R, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  49   2
Wrong    6   0
> mcnemar.test(pre3$Q4.R,post3$Q4.R);

```

McNemar's Chi-squared test with continuity correction

```

data: pre3$Q4.R and post3$Q4.R
McNemar's chi-squared = 1.125, df = 1, p-value = 0.2888

```

```

>
> table(pre3$Q5.R,post3$Q5.R, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  49   2
Wrong    4   2
> mcnemar.test(pre3$Q5.R,post3$Q5.R);

```

McNemar's Chi-squared test with continuity correction

```

data: pre3$Q5.R and post3$Q5.R
McNemar's chi-squared = 0.1667, df = 1, p-value = 0.6831

```

```

>
> table(pre3$Q6.R,post3$Q6.R, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  44   5
Wrong    7   1
> mcnemar.test(pre3$Q6.R,post3$Q6.R);

```

McNemar's Chi-squared test with continuity correction

```

data: pre3$Q6.R and post3$Q6.R
McNemar's chi-squared = 0.0833, df = 1, p-value = 0.7728

```

McNemar test Secondary Schools ALL:

```
> # secondary schools
>
> # 269 pre 269 post
>
> # secondary schools
> table(pre$Q1.2,post$Q1.2, dnn=c("Pre", "Post"));
  Post
Pre  Correct Wrong
Correct  184    6
Wrong    74    5
> mcnemar.test(pre$Q1.2,post$Q1.2);
```

McNemar's Chi-squared test with continuity correction

data: pre\$Q1.2 and post\$Q1.2
McNemar's chi-squared = 56.1125, df = 1, p-value = 6.844e-14

```
>
> table(pre$Q2.2,post$Q2.2, dnn=c("Pre", "Post"));
  Post
Pre  Correct Wrong
Correct  177    4
Wrong    84    4
> mcnemar.test(pre$Q2.2,post$Q2.2);
```

McNemar's Chi-squared test with continuity correction

data: pre\$Q2.2 and post\$Q2.2
McNemar's chi-squared = 70.9205, df = 1, p-value < 2.2e-16

```
>
> table(pre$Q3.2,post$Q3.2, dnn=c("Pre", "Post"));
  Post
Pre  Correct Wrong
Correct  125   14
Wrong    90   40
> mcnemar.test(pre$Q3.2,post$Q3.2);
```

McNemar's Chi-squared test with continuity correction

data: pre\$Q3.2 and post\$Q3.2
McNemar's chi-squared = 54.0865, df = 1, p-value = 1.919e-13

```
>
> table(pre$Q4.2,post$Q4.2, dnn=c("Pre", "Post"));
```

```

      Post
Pre   Correct Wrong
Correct 193  12
Wrong   57   7
> mcnemar.test(pre$Q4.2,post$Q4.2);

```

McNemar's Chi-squared test with continuity correction

```

data: pre$Q4.2 and post$Q4.2
McNemar's chi-squared = 28.058, df = 1, p-value = 1.177e-07

```

```

>
> table(pre$Q5.2,post$Q5.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  79  17
Wrong  104  69
> mcnemar.test(pre$Q5.2,post$Q5.2);

```

McNemar's Chi-squared test with continuity correction

```

data: pre$Q5.2 and post$Q5.2
McNemar's chi-squared = 61.124, df = 1, p-value = 5.359e-15

```

```

>
> table(pre$Q6.2,post$Q6.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct 172  18
Wrong   43  36
> mcnemar.test(pre$Q6.2,post$Q6.2);

```

McNemar's Chi-squared test with continuity correction

```

data: pre$Q6.2 and post$Q6.2
McNemar's chi-squared = 9.4426, df = 1, p-value = 0.00212

```

```

>
> table(pre$Q7.2,post$Q7.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct 187  16
Wrong   37  29
> mcnemar.test(pre$Q7.2,post$Q7.2);

```

McNemar's Chi-squared test with continuity correction

```

data: pre$Q7.2 and post$Q7.2
McNemar's chi-squared = 7.5472, df = 1, p-value = 0.00601

```

```

>
> table(pre$Q8.2,post$Q8.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct 183  17
Wrong   61   8
> mcnemar.test(pre$Q8.2,post$Q8.2);

```

McNemar's Chi-squared test with continuity correction

data: pre\$Q8.2 and post\$Q8.2
 McNemar's chi-squared = 23.7051, df = 1, p-value = 1.123e-06

```

>
> table(pre$Q9.2,post$Q9.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct 245   4
Wrong   20   0
> mcnemar.test(pre$Q9.2,post$Q9.2);

```

McNemar's Chi-squared test with continuity correction

data: pre\$Q9.2 and post\$Q9.2
 McNemar's chi-squared = 9.375, df = 1, p-value = 0.0022

```

>
> table(pre$Q10.2,post$Q10.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct 218  14
Wrong   36   1
> mcnemar.test(pre$Q10.2,post$Q10.2);

```

McNemar's Chi-squared test with continuity correction

data: pre\$Q10.2 and post\$Q10.2
 McNemar's chi-squared = 8.82, df = 1, p-value = 0.002979

McNemar tests by ZOO:

```

>
> # by institution
> # select place
> pre1 <- pre[pre$Questionnaire=="NZG",];
> pre2 <- pre[pre$Questionnaire=="UWEC",];
> pre3 <- pre[pre$Questionnaire=="Zoo Negara",];
>
> post1 <- post[post$Questionnaire=="NZG",];

```

```

> post2 <- post[post$Questionnaire=="UWEC",];
> post3 <- post[post$Questionnaire=="Zoo Negara",];
>
>
> # NZG
> table(pre1$Q1.2,post1$Q1.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  58    1
Wrong   29    1
> mcnemar.test(pre1$Q1.2,post1$Q1.2);

```

McNemar's Chi-squared test with continuity correction

data: pre1\$Q1.2 and post1\$Q1.2
 McNemar's chi-squared = 24.3, df = 1, p-value = 8.244e-07

```

>
> table(pre1$Q2.2,post1$Q2.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  53    0
Wrong   33    3
> mcnemar.test(pre1$Q2.2,post1$Q2.2);

```

McNemar's Chi-squared test with continuity correction

data: pre1\$Q2.2 and post1\$Q2.2
 McNemar's chi-squared = 31.0303, df = 1, p-value = 2.54e-08

```

>
> table(pre1$Q3.2,post1$Q3.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  44    1
Wrong   36    8
> mcnemar.test(pre1$Q3.2,post1$Q3.2);

```

McNemar's Chi-squared test with continuity correction

data: pre1\$Q3.2 and post1\$Q3.2
 McNemar's chi-squared = 31.2432, df = 1, p-value = 2.276e-08

```

>
> table(pre1$Q4.2,post1$Q4.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  70    2
Wrong   16    1

```



```
> mcnemar.test(pre1$Q4.2,post1$Q4.2);
```

McNemar's Chi-squared test with continuity correction

data: pre1\$Q4.2 and post1\$Q4.2

McNemar's chi-squared = 9.3889, df = 1, p-value = 0.002183

```
>
```

```
> table(pre1$Q5.2,post1$Q5.2, dnn=c("Pre", "Post"));
```

```
Post
```

```
Pre Correct Wrong
```

```
Correct 44 0
```

```
Wrong 39 6
```

```
> mcnemar.test(pre1$Q5.2,post1$Q5.2);
```

McNemar's Chi-squared test with continuity correction

data: pre1\$Q5.2 and post1\$Q5.2

McNemar's chi-squared = 37.0256, df = 1, p-value = 1.166e-09

```
>
```

```
> table(pre1$Q6.2,post1$Q6.2, dnn=c("Pre", "Post"));
```

```
Post
```

```
Pre Correct Wrong
```

```
Correct 64 0
```

```
Wrong 23 2
```

```
> mcnemar.test(pre1$Q6.2,post1$Q6.2);
```

McNemar's Chi-squared test with continuity correction

data: pre1\$Q6.2 and post1\$Q6.2

McNemar's chi-squared = 21.0435, df = 1, p-value = 4.49e-06

```
>
```

```
> table(pre1$Q7.2,post1$Q7.2, dnn=c("Pre", "Post"));
```

```
Post
```

```
Pre Correct Wrong
```

```
Correct 70 3
```

```
Wrong 16 0
```

```
> mcnemar.test(pre1$Q7.2,post1$Q7.2);
```

McNemar's Chi-squared test with continuity correction

data: pre1\$Q7.2 and post1\$Q7.2

McNemar's chi-squared = 7.5789, df = 1, p-value = 0.005905

```
> table(pre1$Q8.2,post1$Q8.2, dnn=c("Pre", "Post"));
```

```
Post
```

```
Pre Correct Wrong
```

```

Correct  71  0
Wrong   18  0
> mcnemar.test(pre1$Q8.2,post1$Q8.2);

```

McNemar's Chi-squared test with continuity correction

```

data: pre1$Q8.2 and post1$Q8.2
McNemar's chi-squared = 16.0556, df = 1, p-value = 6.151e-05

```

```

> table(pre1$Q9.2,post1$Q9.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  73    0
Wrong   16    0
> mcnemar.test(pre1$Q9.2,post1$Q9.2);

```

McNemar's Chi-squared test with continuity correction

```

data: pre1$Q9.2 and post1$Q9.2
McNemar's chi-squared = 14.0625, df = 1, p-value = 0.0001768

```

```

> table(pre1$Q10.2,post1$Q10.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  68    1
Wrong   19    1
> mcnemar.test(pre1$Q10.2,post1$Q10.2);

```

McNemar's Chi-squared test with continuity correction

```

data: pre1$Q10.2 and post1$Q10.2
McNemar's chi-squared = 14.45, df = 1, p-value = 0.0001439

```

```

>
> # UWEC
> table(pre2$Q1.2,post2$Q1.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  53    2
Wrong   23    4
> mcnemar.test(pre2$Q1.2,post2$Q1.2);

```

McNemar's Chi-squared test with continuity correction

```

data: pre2$Q1.2 and post2$Q1.2
McNemar's chi-squared = 16, df = 1, p-value = 6.334e-05

```

```

>
> table(pre2$Q2.2,post2$Q2.2, dnn=c("Pre", "Post"));

```

```

      Post
Pre   Correct Wrong
Correct  46   3
Wrong   32   1
> mcnemar.test(pre2$Q2.2,post2$Q2.2);

```

McNemar's Chi-squared test with continuity correction

```

data: pre2$Q2.2 and post2$Q2.2
McNemar's chi-squared = 22.4, df = 1, p-value = 2.214e-06

```

```

>
> table(pre2$Q3.2,post2$Q3.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  14   11
Wrong   26   31
> mcnemar.test(pre2$Q3.2,post2$Q3.2);

```

McNemar's Chi-squared test with continuity correction

```

data: pre2$Q3.2 and post2$Q3.2
McNemar's chi-squared = 5.2973, df = 1, p-value = 0.02136

```

```

>
> table(pre2$Q4.2,post2$Q4.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  45   5
Wrong   26   6
> mcnemar.test(pre2$Q4.2,post2$Q4.2);

```

McNemar's Chi-squared test with continuity correction

```

data: pre2$Q4.2 and post2$Q4.2
McNemar's chi-squared = 12.9032, df = 1, p-value = 0.000328

```

```

>
> table(pre2$Q5.2,post2$Q5.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  15   10
Wrong   24   33
> mcnemar.test(pre2$Q5.2,post2$Q5.2);

```

McNemar's Chi-squared test with continuity correction

```

data: pre2$Q5.2 and post2$Q5.2
McNemar's chi-squared = 4.9706, df = 1, p-value = 0.02578

```

```

>
> table(pre2$Q6.2,post2$Q6.2, dnn=c("Pre", "Post"));
  Post
Pre  Correct Wrong
Correct  20  16
Wrong   12  34
> mcnemar.test(pre2$Q6.2,post2$Q6.2);

```

McNemar's Chi-squared test with continuity correction

data: pre2\$Q6.2 and post2\$Q6.2
 McNemar's chi-squared = 0.3214, df = 1, p-value = 0.5708

```

>
> table(pre2$Q7.2,post2$Q7.2, dnn=c("Pre", "Post"));
  Post
Pre  Correct Wrong
Correct  26  13
Wrong   14  29
> mcnemar.test(pre2$Q7.2,post2$Q7.2);

```

McNemar's Chi-squared test with continuity correction

data: pre2\$Q7.2 and post2\$Q7.2
 McNemar's chi-squared = 0, df = 1, p-value = 1

```

> table(pre2$Q8.2,post2$Q8.2, dnn=c("Pre", "Post"));
  Post
Pre  Correct Wrong
Correct  53  5
Wrong   19  5
> mcnemar.test(pre2$Q8.2,post2$Q8.2);

```

McNemar's Chi-squared test with continuity correction

data: pre2\$Q8.2 and post2\$Q8.2
 McNemar's chi-squared = 7.0417, df = 1, p-value = 0.007963

```

> table(pre2$Q9.2,post2$Q9.2, dnn=c("Pre", "Post"));
  Post
Pre  Correct Wrong
Correct  76  3
Wrong   3  0
> mcnemar.test(pre2$Q9.2,post2$Q9.2);

```

McNemar's Chi-squared test

data: pre2\$Q9.2 and post2\$Q9.2

McNemar's chi-squared = 0, df = 1, p-value = 1

```
> table(pre2$Q10.2,post2$Q10.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  74    5
Wrong   3     0
> mcnemar.test(pre2$Q10.2,post2$Q10.2);
```

McNemar's Chi-squared test with continuity correction

data: pre2\$Q10.2 and post2\$Q10.2
McNemar's chi-squared = 0.125, df = 1, p-value = 0.7237

```
>
> # ZOO NAGARA
> table(pre3$Q1.2,post3$Q1.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  73    3
Wrong   22    0
> mcnemar.test(pre3$Q1.2,post3$Q1.2);
```

McNemar's Chi-squared test with continuity correction

data: pre3\$Q1.2 and post3\$Q1.2
McNemar's chi-squared = 12.96, df = 1, p-value = 0.0003182

```
>
> table(pre3$Q2.2,post3$Q2.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  78    1
Wrong   19    0
> mcnemar.test(pre3$Q2.2,post3$Q2.2);
```

McNemar's Chi-squared test with continuity correction

data: pre3\$Q2.2 and post3\$Q2.2
McNemar's chi-squared = 14.45, df = 1, p-value = 0.0001439

```
>
> table(pre3$Q3.2,post3$Q3.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  67    2
Wrong   28    1
> mcnemar.test(pre3$Q3.2,post3$Q3.2);
```

McNemar's Chi-squared test with continuity correction

data: pre3\$Q3.2 and post3\$Q3.2
McNemar's chi-squared = 20.8333, df = 1, p-value = 5.01e-06

```
>
> table(pre3$Q4.2,post3$Q4.2, dnn=c("Pre", "Post"));
  Post
Pre  Correct Wrong
Correct  78    5
Wrong   15    0
> mcnemar.test(pre3$Q4.2,post3$Q4.2);
```

McNemar's Chi-squared test with continuity correction

data: pre3\$Q4.2 and post3\$Q4.2
McNemar's chi-squared = 4.05, df = 1, p-value = 0.04417

```
>
> table(pre3$Q5.2,post3$Q5.2, dnn=c("Pre", "Post"));
  Post
Pre  Correct Wrong
Correct  20    7
Wrong   41   30
> mcnemar.test(pre3$Q5.2,post3$Q5.2);
```

McNemar's Chi-squared test with continuity correction

data: pre3\$Q5.2 and post3\$Q5.2
McNemar's chi-squared = 22.6875, df = 1, p-value = 1.906e-06

```
>
> table(pre3$Q6.2,post3$Q6.2, dnn=c("Pre", "Post"));
  Post
Pre  Correct Wrong
Correct  88    2
Wrong    8    0
> mcnemar.test(pre3$Q6.2,post3$Q6.2);
```

McNemar's Chi-squared test with continuity correction

data: pre3\$Q6.2 and post3\$Q6.2
McNemar's chi-squared = 2.5, df = 1, p-value = 0.1138

```
>
> table(pre3$Q7.2,post3$Q7.2, dnn=c("Pre", "Post"));
  Post
Pre  Correct Wrong
Correct  91    0
```

```
Wrong    7  0
> mcnemar.test(pre3$Q7.2,post3$Q7.2);
```

McNemar's Chi-squared test with continuity correction

```
data: pre3$Q7.2 and post3$Q7.2
McNemar's chi-squared = 5.1429, df = 1, p-value = 0.02334
```

```
> table(pre3$Q8.2,post3$Q8.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  59    12
Wrong   24     3
> mcnemar.test(pre3$Q8.2,post3$Q8.2);
```

McNemar's Chi-squared test with continuity correction

```
data: pre3$Q8.2 and post3$Q8.2
McNemar's chi-squared = 3.3611, df = 1, p-value = 0.06675
```

```
> table(pre3$Q9.2,post3$Q9.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  96     1
Wrong    1     0
> mcnemar.test(pre3$Q9.2,post3$Q9.2);
```

McNemar's Chi-squared test

```
data: pre3$Q9.2 and post3$Q9.2
McNemar's chi-squared = 0, df = 1, p-value = 1
```

```
> table(pre3$Q10.2,post3$Q10.2, dnn=c("Pre", "Post"));
      Post
Pre   Correct Wrong
Correct  76     8
Wrong   14     0
> mcnemar.test(pre3$Q10.2,post3$Q10.2);
```

McNemar's Chi-squared test with continuity correction

```
data: pre3$Q10.2 and post3$Q10.2
McNemar's chi-squared = 1.1364, df = 1, p-value = 0.2864
```

APPENDIX O

The coding of the interviews

Interview Transcriptions

Abbreviations were used in the results as follows:

- NZG:
 - Managing Director (D1)
 - Education Manager (M1)
 - 1 Senior education officer (O1)
 - 2 Education officers (O2 and O3)
- UWEC:
 - Director (D2)
 - Education and information manager (M2)

There was no education officer available for an interview during the time of the study.
- Zoo Negara:
 - Deputy Director (D3)
 - Education manager (M3)
 - One Education officer (O4)

The zoo director was not available for an interview during the time of the study.
- Other key individuals in the zoo environment
 - Chief Executive Officer of the Johannesburg Zoo (D4)
 - Managing Director of Two Oceans Aquarium (D5)

 - The Executive Director of PAAZAB (D6)
 - The previous Managing Director of the NZG (D7)

Zoo: NZG

NZG 1 Interview – Education Manager (M1)

Interviewer: Researcher (R)

Interviewee: Education Manager (I)

***Start of Interview**

Q	R/I	Interview	Coding
1	R	What is your position in the zoo?	
	I	My name is x and I am the manager of the education function of the zoo.	
2	R	How long have you been in this position and at this zoo?	
	I	I have been at this zoo for about 30 years and in this position... I can't remember, for about 15 – 20 years	
3	R	OK you should be well aware what happens in a zoo because of all your experience. Can you tell me, according to you, what is the main purpose of a zoo?	
	I	Well, I think it depends a little bit on what zoo we are talking about, but in my opinion the main purpose of a zoo should be education because zoos really have wonderful opportunity to hmm educate formally or informally the target audiences.	Function
4	R	How many visitors do you see annually?	
	I	Our Zoo gets about 600 000 visitors roughly.	
5	R	And how many of those are learners from schools?	
	I	It varies. It is a little bit from here to here. But it is about 150 000 to 200 000.	

6	R	And according to you, how does this zoo compare to other zoos if you look at the WAZA zoo conservation strategy.	
	I	Hmm. Ok. If we compare to other zoos within South Africa, than we are without a doubt the best zoo in the country. If we compare to other zoos in Africa then we are, I think, also the best zoo in the whole continent. If we look at zoos internationally, then we are competing well with others.	
7	R	Do you think that zoos are in fact contributing to the conservation of endangered species?	
	I	Yes, I think they do...hmm...there are obviously different levels in which zoos are doing that. Some of them are going into a lot of detail and are really doing an excellent job, and others hmm don't put a lot of emphasis on it.	Function
8	R	How do you see the role of zoos in terms of research?	
	I	Hmm zoos can contribute a lot of hmm, in the research field, as far as certain hmm areas of study are concerned hmm and then obviously zoos can also contribute a lot by looking at animals in their natural habitat which many zoos are doing.	Function
9	R	How do you see the role of a zoo in education?	
	I	Well, as I said earlier on, I think it is a very important facet, hmm, I don't believe that zoos really put enough emphasis on it. Hmm there are various reasons for that. One of them being that everybody is always into conservation and research and education is seen often as...as sort of a second rate function.	Function Weakness
10	R	And in recreation?	
	I	That has always been a very important function of zoos and will always remain so.	Purpose
11	R	Does this zoo have PAAZAB accreditation?	

	I	Yes, we do.	
12	R	What do you think is the biggest limitation of African zoos complying with PAAZAB standards?	
	I	Hmm, I think that resources are a severe limitation , and that obviously has an effect on everything else, on the other hand I also think that the accreditation system is not suitable for Africa, because it is a fairly, a very high standard and you either comply or you don't instead of having a tier system where zoos can aspire to the basic tier and then actually progress from there upward. So in my opinion there is very little emphasis on capacity building within the PAAZAB accreditation system.	Weakness
13	R	We spoke about scientific research earlier, but does the zoo play any role in social studies?	
	I	Well, do a lesser degree. We have a research committee that looks at all these applications, and a small percentage of the research done at the zoo fall in the social sciences.	Weakness
14	R	Does the zoo have an animal collection plan?	
	I	Yes, it has one.	
15	R	So, do you think that every and each animal in the zoo has a role to play?	
	I	Hmm, the animal collection plan is something is being implemented at the moment. So, at the moment: no. In future, yes.	
16	R	In general, do you think that zoos serve the best interest of animals?	
	I	That is a loaded question, because nothing in this world serves the best interest of animals. So, hmm, zoos are an option to serve the interest of animals, but there is no institution that serves the best interest of animals, because then we should leave them alone and allow them to do what they are supposed to do. But because there are people everywhere we can't do that and so zoos are one of the options in which we look	Weakness

		after animals and there welfare.	
17	R	For this study I'm using the logic framework to evaluate the programmes of the zoo, and the term we use is the impact – is the change you want to see in a community after a period of 7 – 10 years on a long term, what is this impact you want to see this zoo achieving in the community?	
	I	Well, on the one hand to become more aware of nature and the environment, and thus have less of an impact on nature and the environment, and on the other hand, because we are a NRF facility that we also promote science understanding, and science and technology understanding in general and then also as far as career path for the youth is concern.	Impact
18	R	We also speak about outcomes that are short term outcomes that you can achieve in one to three years, and longer term outcomes that one can achieve in four to six years. What are the short term outcomes you want to see the zoo's programmes achieving?	
	I	Well, short term programmes are really based, linked to the various activities that we have. Hmm, so on the one hand schools attendance we are looking at numbers that should be increasing and are making more use of our curriculum that we developed.	Short Outcomes
19	R	Are you achieving the short term and longer term outcomes and how do you know this?	
	I	We have got a table of KPI's and we report on those KPI on a monthly, quarterly and annual basis.	
20	R	What strategies do you have in place in order to achieve the outcomes?	
	I	Well we have, hmm, I suppose it's the normal manual business strategies, so there are business plans that are being put together annually. There are hmm, there is a reporting framework in place. There's a system of meetings in place. So the progress is monthly checked against the strategy.	

21	R	Do you think your programmes are making a change in the community?	
	I	Well, the question is "do I think".	
	R	Ja.	
	I	Yes, I do think they make a difference, and I, can I verify that? No, I can't verify that, except anecdotally. Yes, there is evidence that students that uh, that become scientists that we have, but at some stage we need to do a formal study and look at what really is the impact.	Long Outcomes Challenges
22	R	Do you evaluate the impact of Conservation Education programmes on a public interface level, and if you do, how do you do it?	
	I	The public interface, so that does not relate to the learners?	
23	R	No, not learners.	
	I	Hmm, there are some studies that are being done from time to time, but hmmm, there is no formal system in place.	Evaluation
24	R	Do you evaluate the impact of your formal Conservation Education programmes that is now with school learners and if you do, how do you do it?	
	I	Some of them are evaluated, but not all of them.	Evaluation Weakness
25	R	Are the Conservation Education programmes worthwhile in terms of the cost?	
	I	Well, yes.	Strength
26	R	And in terms of input and results?	
	I	Yes.	Strength

27	R	Are the education programmes sustainable in terms of the support it receives from your management?	
	I	Yes.	Strength
28	R	How?	
	I	Well, it is part of the NZG's mandate and our business plan and our strategic plan and our everything. The zoo basically has to do education programmes, even if one looks at WAZA and PAAZAB, then yes, it is part of our mandate. It is not an additional extra, it is part of what we need to do.	Strength
29	R	Are the programmes sustainable in terms of follow up made?	Strength
	I	Ja.	Strength
30	R	Updating of information?	Strength
	I	Yes.	
31	R	And the administration there of?	Strength
	I	Ja.	
32	R	What exposure to you get?	
	I	Exposure in which sense?	
	R	Media.	
	I	We have a department in the zoo that deals with the media. So there is regular meetings and there's just a new media officer appointed, so I actually trust that whatever level we were at in the past that that is improving now.	Weakness
	R	So, are you happy with the exposure you are getting currently?	

	I	No, but that is why the media officer was appointed.	Strength
33	R	Are the programmes in line with the zoos social responsibility requirements?	
	I	Our education programmes?	Strength
	R	Ja, education programmes.	
	I	Yes.	
34	R	Do the programmes provide marketing possibilities for the zoo? This is now the education programmes.	Strength
	I	Ja.	
35	R	Do they improve the zoo's image?	Strength
	I	Most definitely.	
36	R	Is the zoo's name visible at all programmes, workshops, certificate functions etcetera.	Strength
	I	Yes.	
37	R	Why should your programmes be supported by government funding or public funding?	
	I	Because there is in all countries in the world, there is hmm a need for informal education and also non-formal education, and South Africa is no exception.	Future
38	R	Are the presenters of the programmes, that is no zoo educators and volunteers, able to manage and develop the programmes well, and how do you know that?	
	I	Well, yes we, I think they are able to do that. Hmm how do I know that? Hmm still need to, as I put it to you previously, we still need to do an external evaluation at some stage, but at the moment our programmes link with whatever area they need to link to.	Weakness

39	R	How do you know that the content of the programmes are clear to the learners?	
	I	Than you can only determine by monitoring and evaluation.	
	R	And do you do that?	
	I	To a certain degree, but it can improve with our new system that we are implementing.	Weakness
40	R	How do you ensure that your learning support materials used for your programmes is of a good standard?	
	I	We have a curriculum developer on board.	
41	R	Do the programmes provide sufficient resources?	
	I	Well you know, the question is always what is sufficient. Hmm, because you can always do more, but yes, within the present circumstances, yes they do.	Weakness
42	R	Do you include satisfaction surveys in your programmes?	
	I	Yes.	
43	R	Do you get regular report from presenters with regard to your satisfaction surveys?	
	I	Hmm yes.	
44	R	Do the programmes prove the be worthwhile in terms of the money you spend on it?	
	I	Yes.	
45	R	Do you give support to teachers?	Strength
	I	Yes. We offer workshops.	
46	R	Is the impact of your formal education programmes evaluated?	
	I	Hmm, some of them, yes.	

	R	How?	Weakness, Evaluation
	I	Uh, by means of evaluation programmes.	
	R	Is the impact of the informal programmes, that is the free choice learning, evaluated with regard to school children? This is now when you don't have a formal programme, they just go through the zoo on their own.	
	I	It is not evaluated as far as the impact, it is more a satisfaction survey.	Weakness
47	R	Do you have a written education policy?	Strength
	I	Yes, a strategic plan.	
48	R	What are your future plans for Conservation Education as manager of this department?	
	I	First of all, to streamline the different roles within the department, and to ensure that we have a better alignment that what needs to be achieved, and then the whole issue of monitoring and evaluation and that we actually achieve the impact that we intent to.	Opportunities Evaluation
49	R	What is your opinion on the existence of zoos in modern society?	
	I	I think on the hand that zoos and aquariums do a wonderful job and on the other hand I think that they can also do more. I think that certain zoos really do an excellent outstanding job. Other zoos and aquariums should rather be closed down. So hmm, you know there are some good zoos and programmes and there are some really bad ones, but in general I think that zoos can really do more as far as their impact is concerned.	Opportunities Threat
	R	Thank you for your time.	

*End of interview

Zoo: NZG

NZG 2 Interview – Managing Director (D1)

Interviewer: Researcher (R)

Interviewee: Managing Director (I)

***Start of interview**

Q	R/I	Interview	Coding
1	R	How do you see the purpose of a zoo?	
	I	Oh, look the main purpose of zoo is to kind of act as a showcase for global wildlife biodiversity. So, where ever the zoo is, you know, it reflects biodiversity, even from across the world. It is then for them to decide how much of the local contents they will have and how much of the global contents. But it is primarily a showcase for that. But in the process of acting as a showcase, the zoo obviously has to manage the animal collection, whenever possible also to play a role in conserving the counterpart of the species that we have out in the wild as far as possible. Then engaging with the public around Conservation Education to Environmental Education, and also to do some research that informs conservation both inside and outside, you know, the zoo. But, they also finally provide a platform, a kind of an ecotourism platform, you know. It serves as a platform primarily if you are in a metropolitan area like where we are. It serves to connect people with wildlife by providing a platform of Environmental Education.	Purpose

2	R	So, you kind of, hmm, downplay the conservation role of a zoo a little bit. How do you see the conservation role.	
	I	It is not a primary role.	
	R	It's not?	
	I	The animals are outside of their natural habitat. You have to remember that conservation of both the animal and the habitat where the animal would ordinarily exists, you know. Once you've taken it out of its habitat, the greatest contribution that you can make for that animal if it is endangered is through conservation breeding of either to act as an insurance population for once the animal is extinct in the wild, or for the purpose of releasing animals in either the natural range that they have exist now or in the past. But sometimes because the natural range does not exist anymore, you look at the habitat that is similar to that. So already the role that zoos play is one of making a qualified contribution. I don't see zoos as being the leaders in conservation, unless they have a cohort of people that are working fulltime or a significant time out in the wild, you know, undertaking conservation projects like those zoos that are linked to zoological societies, like the zoos of London or San Diego or Chicago. Those guys, you know, have full time scientists of conservation working out in the wild. They are attached to the zoo because of the association of the zoological society and then the zoo. So that's really where zoos can provide a leadership role in the conservation prospective.	Purpose
3	R	Thank you very much. If you look at PAAZAB, we are making ready for PAAZAB accreditation again, the zoos in Africa, African zoos, very few of them comply with the PAAZAB accreditation standards. What do you think is the biggest limitation of African zoos to comply with the PAAZAB standards.	

	I	The biggest limitation is resources , simple that is all it comes to. Because you will find that the zoos want to maintain a high standard in terms of the quality of the enclosures or the holding facilities that they have for the animals. But there is just no money coming through from the government or the private sector and to allow those zoological institutions to build the best facilities that they can. So that is the first part, the second part is with regard to the capacity that is available, the staffing capacity . There is also no money to employ qualified and passionate people, hmm people that is passionate about wildlife. So that is the biggest problem. I don't think it's a cultural or other issue. You know, those people are just as passionate about the animals that they look after. It has nothing to do with anything...	PAAZAB
4	R	You well do you think our zoo, this zoo compare to other zoos internationally. How do you think do we compare according to WAZA standards?	
	I	Ja, we compare very well. I mean I've been to many zoos in Europe, America, Australia, and we compare quite well. Look, there is no doubt that our zoo is on the old side, the infrastructure is dated, you know, but I still think that we compare well with most zoos globally. It's only the top end zoos that have lots of money, that have been able to re-capitalize and built new things.	
5	R	Hmm if you look at our education programmes, what is it that you want to see us achieving as an impact over a period of say ten years' time?	
	I	Look, there's two, there's two audiences really that we serve, one is the education audience, that is the schools, you know the school learners and teachers. There I think that they role that we can play is one of supporting the improvement of the quality of teaching of Life Sciences and environment education you know. There the role I think we can play is developing high quality educational materials that both teachers	Impact

		<p>and learners can utilize in a manner that improves and enhances their ability to learn and understand, you know, the material. So that's the number of schools that just come, just come through the zoo, you know. But the biggest impact I think that we could make is, if we have a structured way around it, is fine tuning the knowledge levels and expertise of the teachers. They come, you know, so they go through groups of learners every year, you know. They teach a different class every year, you know, or classes in some cases, every year. So, if they are empowered, then they can transmit that that knowledge through the way that they teach the young people. So I think we have limited uh, I think we had limited impact in that regard and I think we can reach more teachers, but what we probably need to strike some deal with the Education Department, you know, such that we can be recognized as a Life Sciences resource for Gauteng teachers, let me put it that way, even if it's just for Pretoria, you know.</p>	
	R	Something like what Scibono is doing?	
	I	Exactly, Scibono does doing that for Physical Science, we should benchmark and position ourselves as the Life Sciences hub.	
	R	Because, if I may say so, sometimes we feel that we have, we go to the Gauteng Department with what we can offer and we are sometimes not that sure that they want us to do this. So I think a more formal agreement is a good idea.	
	I	<p>Yes, look, so that is the one half. The other half is with the general public. The biggest impact we can make there is about increasing the public's awareness about, you know, about the conservation status of the animals we keep, you know, but also giving them practical pointers around environmental sustainability, and then tracking that all the time, you know, in terms of do people actually do the things that they say they do or</p>	<p>Purpose Impact</p>

		to what extent are they able to play their own little role in terms of how they manage their households with regard to environmental sustainability from their own point of view. So, I think we can change attitudes, and we can change knowledge. And hopefully change actions, change actions of people. But it requires a very focused and concerted effort. If we are going to make such a change, but also, we need to have the necessary research tools to be able to ask questions and get answers and track people's behaviour and attitudes.	
6	R	You have kind of answered this question in a way, but do you want to add maybe anything if I ask you what are your future plans for Conservation Education for this zoo?	
	I	Look, t, the he best position for us will be the establishment of the Science Centre because it will provide a focused hub to deliver programming. Right now it is lacking. We don't have the right facilities, or the capacity, to deliver, you know, dynamic, fresh, extensive, you know, programmes, because we don't have the space. If we had lecture rooms and lectures halls...	Future/Opportunity
	R	And laboratories?	
	I	And laboratories you know, because for example one of the areas where we can make a big for those schools that don't have biology laboratories, you know We can establish those here, a couple of those. We can help at least some of those schools and take them through the syllabus.	
	R	And offer practicals?	
	I	Yes, and offer practicals so that the kids can actually help some of those see what they are suppose to see in terms of the experiments. I think that will make a fundamental impact.	
7	R	The last question doctor is about your own opinion the existence of zoos in modern society. Do you think	

		we still have a place?	
I		<p>You ja, I think so. I think that people must not confuse the existence of sub-standard zoos with whether or not zoos should or should not exist. Those are in my view two separate issues. I believe that good quality zoos, you know, can play an important role in helping know and understand wildlife. It is close quarters. Particularly in situations where people don't have the means to go out to the parks, the national parks or regional parks. There are very few people that have the means to go out to the parks. They don't have transport. There's now public transport to national parks and they don't have money, you know, to pay, you know. If you compare what you pay to go to Kruger, or at Sun City national park. It is maniculous, more than maniculous to what you pay at a zoo, either Johburg or here. So I think that they still play a very important role because, uhm, the provide that platform to connect, you know, animals and wildlife, you know with people, you know, that would not exist in any other way. And I hear people talk about we know have the internet and all that. It's different, you know. You can't smell the animal dropping over the internet, you know. Uh, you know, the whole experience is very different, and we still have an opportunity, uh, to see animals, those that till exist. Why would we just walk away form that? And in any case there is not sufficient open spaces across the world where animals could be and in such that people can also could go and see them. You can't just walk away from that. It is just not possible.</p>	Place
R		Thank you.	
I		<p>So, in a way, zoos also take the pressure away from parks. Because imagine that all the people that went to the zoo now had nowhere to else to go, they would all now go into the parks which now cause more environmental damage, and undermine whatever conservation issue is taking place.</p>	Place Function

	R	Ja, than what we already have.	
	I	You can just imagine. And I don't think people think of that as part of the argument. so	
	R	Thank you, doctor.	

***End of interview**

Zoo: NZG

NZG 3 Interview – Senior Education Officer (O1)

Interviewer: Researcher (R)

Interviewee: Senior Education Officer

Start of interview

Q	R/I	Interview	Coding
1	R	Tell me, what is your position at the zoo.	
	I	Senior education officer.	
2	R	And how long have you been here now?	

	I	Uhm, I started here nineteen nine, in May. So it will be Thirteen years.	
3	R	Sjoe. That is a long time. Uhm. How many visitors do you see annually with your programmes.	
	I	Learners is about two hundred thousand.	
4	R	Sjoe. And you are now the supervisor of all the education activities that are happening in the zoo?	
	I	That's correct.	
5	R	Uhm. According to you, what is the main purpose of a zoo?	
	I	I think mainly education and conservation.	
6	R	Both, education and conservation . Do you think that a zoo is in fact contributing to conservation?	Purpose
	I	I think we are, especially now that we have the research department. There are lots of things that they are doing that contribute to conservation, understanding the new diseases that are coming, and now people are talking about DNA, so I think the zoo is contributing too much on that part.	
7	R	Do you think the zoo is serving the best interest of animals?	
	I	We are. I think, most people around us, they don't know about animals. And uh, o educate the people about animals , I think it also helps the animals to survive and to have a better change in the wild because if they don't know about the animals, they hunt them. They kill them and we won't have anything I the end. So the zoo is helping to educate the public to understand the animals rights.	Purpose
9	R	And therefore we are serving the best interest. OK. What are the changes you want to see happening because of the programmes you are supervising and running here, in a long term, over a period of let's say 10 years. In the communities, what is the change you want to see happening?	
	I	Uh, mainly if the mind-set of people can change . Especially on the environmental side where people do not	Impact

		respect the environment, do not see the need to recycle. I think our programme should be able to educate the learners at the moment that when they grow up comprehend that lifestyle.	
10	R	Do their children again?	
	I	Ja.	
11	R	OK. And on a shorter term, on say one to three years, what are the changes you want to see happening?	
	I	We want to see the children's marks increasing. We also need to see the teachers respecting the animals around them. And uh knowledge increase, attitude change. I think we are actually doing it.	
12	R	And do you think you are achieving this?	
	I	Ja. I think we are.	
13	R	How do you know that?	
	I	Uhm, we are looking at the children we see. The ZooClub kids, the way they behaved before and when they just arrived and the way they are behaving now. You can tell that they, they are now understanding what they are doing.	
14	R	Do you evaluate your programmes, the programmes you are offering.	
	I	Not formally, but we do have some worksheets that we sometimes ask the teachers if they are happy with the programme if there are any suggestions.	Evaluation
15	R	Do you think what you are doing, these programmes are worthwhile in terms of the money that you spend on it?	
	I	We don't spend much money on the programme, so I think ja.	
16	R	Would you like to have more money to spend on it?	

	I	It will be nice to have more money because it will increase the resources that we are using.	
17	R	Ja, that's going to be my next question. Are you happy with the resources. So you would be able to increase your resources.	
	I	And improve it.	
18	R	So develop more resources and improve it?	
	I	Ja.	
19	R	And if you think about all the effort you put into this. You know it is a lot of hard work, and the results you get. Do you think it is worthwhile because of that?	
	I	I think it is worthwhile.	
20	R	Are you happy with the support you get from management?	
	I	Uhm. Not really. Uhm. There are things like, uh, putting up stations in the zoo...We, we need that. And there is not much support from management. You request that several times for money, for proper stations that when children come can be attracted, get closer too, and that's not happening.	
21	R	Are you happy about education, do you think that the education programmes are sustainable in terms of uhm, follow ups made and updating information, and administration? Support in that way.	
	I	We have different kinds of programmes, so most of them, the administration is too much, uh, follow up is less, then there are other programmes like the ZooClub where the follow up has to be too much, but schools visiting the zoo and going back, we don't do much follow up. It's only the newsletter that we send to them to communicate with them. But that is not a two way communication, it is actually a one way communication, because they don't actually respond to that.	

22	R	The programme, our programmes now, uh, if you look at social responsibility, are you happy with that?	
	I	So far I'm happy with what we are doing, especially with the adopted schools. We are still in the beginning stage, but I think we are doing enough.	
24	R	Do you make sure the zoos name visible at workshops, and certificate ceremonies and science shows that you take your programmes to?	
	I	Yes, we always have banners that indicate that we are from the zoo, so people always know when they are coming. And the vehicle that used to use was clearly marked that it was from the zoo. So we need to get a new one and mark the way it was.	
25	R	Cough. Excuse me. So why should the government give you money to run programmes at the zoo?	
	I	Because we are helping the citizens of this government need to learn about the nature so that they live sustainably to help the government to be sustainable.	Purpose
26	R	OK. Your education officers, and volunteers, and interns working for you. Are they able to manage and present the programmes well enough?	
	I	They are able to present but we don't put much effort on training them that we need to improve on that.	Training
27	R	On the training?	
	I	Ja.	
28	R	Uhm. How are you sure that the content of the programmes are clear to the learners?	
	I	We actually look at the programme and check the curriculum and make sure that it goes hand in hand and it's also in the level of the learners. So We also invite the education department staff to help us with the development of the lessons.	Quality

29	R	And your learning support materials? How do you make sure that it's of a good standard?	Quality
	I	We have a curriculum developer that checks that.	
30	R	And we talk about this before, uhm, do you have sufficient resources. You said that you would like to have more?	
	I	Ja.	
31	R	OK. And we already talked about the satisfaction surveys, you said are doing that.	
	I	Ja.	
	R	Uhm. Your presenters and education officers, do they supply regular reports to you?	
	I	Supply reports?	
	R	Yes, reports.	
	I	Monthly reports they send once a month.	Quality/Input
32	R	Do you give support to teachers?	
	I	We do give workshops to teachers, especially on content, to make sure that they understand what they teach in the classroom.	Input
33	R	And the evaluation of your programmes. We have touched on that. Do you think that it can still improve?	
	I	Yes, they can improve.	
34	R	Does your zoo have a written education policy?	
	I	Uh, we have a new education policy on education but there are other many policies that go hand in hand with that.	Input

35	R	And a strategic plan.	
	I	We have a strategic plan.	
36	R	What are your plans for Conservation Education for the future?	
	I	I would like to see more children, especially from the rural areas, getting involved. We involve more town schools at the moment. I would like to see more of rural areas and to increase knowledge as well by the programmes that we present.	Future/Opportunity
37	R	Do you want to do that with outreach programmes or do you actually want them to come to the zoo.	
	I	I think both outreach and learners coming to the zoo.	
38	R	Hmmm. So you would have to have more money?	
	I	Yes.	
39	R	I think you have to go to your director and ask for more money! Laugh. What is your personal opinion about the existence of zoos. Is there still a place for a zoo?	
	I	People don't have much to do out there so zoo in one of the entertainment areas. And it is our change to we make it an educational institution. So the people coming for entertainment, we educate them.	Purpose
	R	Thank you very much.	
	I	You are welcome.	

Zoo: NZG

NZG 4 Interview – Education Officer A (O2)

Interviewer: Researcher (R)

Interviewee: Education Officer A

Start of interview

Q	R/I	Interview	Coding
1	R	How long have you been at the zoo?	
	I	Ahh, I've been here at the zoo for about...8 years now.	
2	R	What is your position?	
	I	I am and education officer.	
3	R	Education officer. And you were that all the time that right from the beginning.	
	I	Ja, ever since the beginning I was an education officer.	
4	R	What kind of programmes do you work with?	
	I	Uhh, I basically work with outreach. Ja, and I focus on high schools. Uh, the programmes that I have are more related to the curriculum. What the learners are doing in Life Science in high schools.	

5	R	How many learners do you see in a year?	
	I	In a year, for outreach, ah, we see something like ten thousand learners, ja.	
6	R	And they are all from local schools, if I say local schools in the NZG or where do you take your outreach programmes to?	
	I	Most of the outreach is actually done locally which is in the municipality of Tshwane, but we do go out to some other schools that are outside Tshwane.	
7	R	So you do take your conservation message or whatever you want to achieve with your programmes out of Tshawne as well, to other provinces even?	
	I	Yes, to other provinces such as Limpopo..Ja, we do take them out. Like North West. We do go there in some of the cases.	
9	R	And according to you, what do you think is the main purpose of a zoo?	
	I	Uh, I think the main purpose of a zoo is about conservation. Taking care of the wildlife.	Purpose
10	R	Do you think that zoos are in fact contributing to the conservation of endangered species?	
	I	Yes, to some extent, they do, they do they do contribute al lot, ja.	
11	R	Do you think that zoos serve the best interest of animals?	
	I	Jaaa, look on that not necessarily, I'll say yes but you must remember that in the zoos animals are not in their natural environment, but take them out. There are lots of challenges in the natural environment. But in other cases we can yes, we do take care of them, especially those animals that we find they are more vulnerable outside there. Yes, the zoo is doing a good job to take care of them.	Place
12	R	Fantastic. And I'm going to explain to you just this word that I'm going to use, it is the impact.	

		Hmmm.	
	R	If we talk about impact it is a change you want to see in the communities where you are working, over a long period. So over 10 years, time. What is that impact that you want to see the zoo achieving with the programmes that you are running?	
	I	Uh, in the long run we want to see the society or the community, uh, taking care of wildlife. Respecting animals. Knowing that animals are out there. People should not kill them as they wish. But we want them to respect them and to know that They also have to rights to live.	Impact
14	R	And if you can break that down to shorter term outcomes. What do you want to achieve on a short term outcome, so within a year, with your programme?	
	I	Within a year, obviously as our programme is actually linked to the curriculum and we, we want learners to learn life science and to be able to achieve at school and to have a responsibility of what they are doing that is related to Life Sciences.	Short outcomes
	R	So you can say it also maybe, an improvement in what they are learning, improvement of the results at school?	
	I	Exactly. Improvement of their results at school.	Short outcomes
15	R	Are you also working on gaining, on letting children becoming more interested in Life Sciences?	
	I	Yes, that is one other thing that we are doing actually to arose learners interest in Life Sciences so that when they see as they are learning Life Science at school, they should not see it as Life Science in a book in a theoretical manner. But we are also bringing in the practical part of Life Sciences to understand it better.	Short outcomes

17	R	OK, so do you do, kind of with your activities and your outreach programmes, do you do practicals? Do you kind of show them how nice it is and how interesting it is	
	I	Yes, there are lots of practicals that we do, like to give an example there is a programme on genetics when learners do a DNA extraction. We also have other programmes on biodiversity where learners can do some other things like say dissecting, and see life animals. Although we use stuffed animals, for them to see them actually how they look.	
18	R	OK. So, we spoke about the short term, long term outcomes. Do you think that you are achieving these outcomes?	
	I	Yes, I'll say ja we are getting there. Though, t is not a simple thing, but yes, we are actually getting there.	
19	R	How do you know this?	
	I	Uh, we see this with some of the learners that you find that in high school and after completing high school that they take careers that's related to the Life Sciences , so that we can see, and they also come back to us, so yes, they say because of you encouraging us now I'm doing a course in veterinary science, now I'm maybe doing a course in biotechnology. That's related to the Life Sciences. So because of that we can say, yes we are achieving.	Evaluation
20	R	Uhm just quickly tell me about what different kinds of lessons you have in your outreach programmes. It is the genetics one, and then, are there more?	
	I	Ja, we have one on genetics, we have one on uh rhino poaching, we have one on biodiversity, we have the other one the ecosystem. Ja, I mean.	
21	R	And something like rhino poaching is a very relevant issue, but maybe controversial as well?	Long outcomes

	I	Yes, yes it us a relevant issue because as you can see what is happening in our country now, if we check on the statistics, so many rhinos are being poached. So we want to send out this message to the learners, because if we teach them as they are still young, you know so, that when they become adults they will be responsible and make sure that we reduce the poaching rate that is happening in our country.	Long outcomes
22	R	Do you think that the children actually take that conservation message out to their own communities as well? If you have a lesson and you tell them now why they should protect the rhino and what they can do. Do you think that they will go home and spread the word?	
	I	Yes, we believe that they do. Although we know not all of them, but we know that some of them or few will take the message to their homes to their families and event to those that are in other grades and discuss these things.	
24	R	Would you say that the Conservation Education programmes of the zoo, not just of your programmes, but the zoo in general, are achieving what they are intended for?	
	I	Yes, I think they are achieving. If I look at the different programmes that we have, yes, I would say yes, yes we are achieving.	
25	R	Do you evaluate your programmes, the impact of your programmes?	
	I	Yes, we dooooo, we do evaluate our programmes.	
26	R	And, if I talk no about evaluating the impact of your programmes, but do you also just do monitoring, maybe a satisfaction survey?	
	I	Yes, although we don't do it for all the programmes. Ja, we do it for sampling. Sometimes, look it is not easy to do the programme and evaluation in all the programmes, but in some of the programmes when we have	Evaluation/Challenges

		time we do that.	
27	R	And I suppose for science shows when you have big audience, time can be a problem. Do you think time is a problem in evaluation?	
	I	Ja, time is always a problem because when you do science shows you have limited time. You have an hour, or 30 minutes and then you find the learners they want to go home. That is also a problem in doing evaluation.	Evaluation/Challenges
28	R	And if you are looking at your programmes you spent a lot of money on it. Talking now from the zoo. Is the zoo is spending a lot of money. Do you think it is worthwhile in terms of the costs, the money the zoo is spending on your programmes?	
	I	Ja, look, you see in terms of education, yes, yes it is. The money that we are spending, I can even say that we need to spend more, because if they are saying education is expensive, and I think the money that we are spending. Ja, it is worth it.	
29	R	And if you look at all the effort you put in, going away from your family, be away from the zoo, and looking at the results you are getting out. Do you think that it is that what you have to put in and what you get out?	
	I	Yes, it does worth it, because as we said our main aim is to make sure the learners at the end of the day, that they follow a career in the Life Sciences. If you see learners following careers in the Life Sciences and you see that the message of conservation is reaching the people there, we are happy and we see that we are doing the right thing.	Impact
30	R	Are you happy with the support you receive from management?	
	I	Ja, I'm happy.	Strength

31	R	And do you think that your programme is sustainable in terms of follow up made and the input from zoo management, the updating of information and the administration. All of that? Do you think that it is sustainable?	Strength
	I	Yes, I think it is sustainable what we usually do every year at the end of the year, we sit down we check the programmes. We see if there are things that we need to change and we change those things. Look, sometimes we develop a programme thinking that it is going to go well. But if you implement it you realize that there are some shortfalls then later we look at that programme and we change it and everything goes well.	
	R	Are you happy with the exposure you get in the media, from the zoo's side, like zoo e-news, zoo articles?	
	I	I'll say the exposure is not up to th level we will expect. Yes, there is an exposure but I think the exposure is very low. I actually wish that we can get more exposure based on the things that we are doing.	Weakness
	R	Uhm, the programmes that you are offering do you think that they are in line with the zoos social responsibility requirements to, towards learners from poor communities etcetera?	
	I	Yes, I think yes it is in line. Just to give an example we two schools that we have adopted, starting from the poor communities and we are, we are assisting those schools, with, eh, they don't have to pay, not even a cent. We just go there and help them. And yes, I think we are, uh, responding to that.	Strength
32	R	In your outreach programmes at your science shows that you've got, is the zoo's name visible enough?	
	I	It is on your banners. We have banners that we put there, big banners they have written National Zoological Garden, yes, yes they are.	
33	R	If somebody has to ask you but why should the government fund you, why should we take public money, tax	

		payers money and fund your programmes, why would you say?	
	I	Yes, because we are using that money for a good cause. The main purpose is to teach learners about the life science and encourage them to sort of choose careers in life sciences, and also conservation message that we teach them. For example I can give an example of a rhino poaching. If the government is giving us money we will be teaching people about the rhino, we are conserving the rhino.	Purpose
34	R	You have people working with you, volunteers and other zoo educators, are they able to manage and present and develop your programmes well enough?	
	I	Yes, uh, with zoo partners and volunteers obviously we first train them. It takes time for one to actually understand what is happening, but eh, after some times, yes. They, they get right and they are able to do.	Training
35	R	So you have to train them first?	
	I	You have to train them first and it's not a training that you can do in one day and expect them to be perfect the following day. It is something that takes time but we know that in the end they are able to do it.	Training
36	R	And how do you know that the content of your lessons and your programmes are clear to the learners?	
	I	Uhm, what we do like the first thing we make sure that we align it with the national curriculum statement as is required. And then we take it from there and we make sure. It is not like that we are teaching a programme from scratch, you will find that the teachers, they have laid the foundation. And we just come in with the information just to re-in force what teachers have been doing in the class.	Quality
37	R	And how do you ensure that the quality of your learning support materials, uh that you use for the lessons is of a good standard?	
	I	Ja, we as, as a team, we have a uh curriculum developer who is also assisting us making sure that	Quality

		everything is of good quality and everything has been checked and the programmes, we check everything on the programme, grammar and spelling and the content and everything is of the right level.	
38	R	Do you have enough resources?	
	I	Ja, resources are always a challenge. Resources, we do have resources but I think they are not enough.	Weakness
39	R	Do you think that the zoo can give more money towards education and resources?	
	I	Ja, I think if the zoo can give us more money then we will be able to develop uhm some more resources.	Weakness
40	R	Do you give regular reports to your supervisor and your manager.	
	I	Jaaa, every month we make sure that we write reports and submit those reports.	Input
41	R	And do you give support to teachers?	
	I	Yes, we have teachers' workshops that we do. Usually we work with subject advisors. What they do they want a workshop on a particular topic and they invite us or teachers they come to the zoo and we do the workshop for them.	Input
42	R	Does the zoo have a written education policy?	
	I	Uhh, I'll say it is there but you will find the policy it needs some revising and to change some other things and to make sure that it is, is in line.	
43	R	And a strategic plan?	
	I	Yes, we do have a strategic plan.	
44	R	Personally, you and what you are doing for your programmes and your job.	
	I	Yes, I have a strategic plan what usually happens is that there is a strategic plan for the whole department and I use that strategic plan to narrow it to what I am doing.	

45	R	What are your future plans for Conservation Education?	
	I	Uh, the future plans is to take this message of conservation to out to the communities that have not yet been reach and to make sure that they get this message and also to make sure that the learners out there that they understand life sciences and they actually follow careers in life science.	Future/Opportunity
46	R	Your own opinion, do you think that zoos still has a place and a role to play in this modern society that we live in today.	
	I	Yes, the zoo they still have a place and a big role to play. Most especially when looking what is happening at the example of rhino poaching that I gave. And one thing that I the learners are out there. The message of conservation is actually a challenging message to them that they still need to learn and they need to understand it better. And the zoo is there to give them this.	Place
47	R	Thank you very much for your time.	
	I	Thank you.	

***End of Interview**

Zoo: NZG

NZG 5 Interview – Education Officer A (O3)

Interviewer: Researcher (R)

Interviewee: Education Officer B

Start of interview

Q	R/I	Interview	Coding
1	R	Tell me, how long have you been at the zoo?	
	I	It is about, huh, 8 years now.	
2	R	And what is your position?	
	I	My position is of education officer.	
3	R	And what type of programme do you run at the zoo?	
	I	Here at this zoo it is youth and career.	
4	R	Youth and career. And what does that involve, is it education programmes for zoo or is it extracurricular?	
	I	It is extracurricular programmes. We can maybe just call it informal education. They fall under informal education programmes.	
5	R	So that will involve youth courses, and ZooClub and things like that?	

	I	Definitely.	
6	R	OK. According to you, what do you think is the main purpose of a zoo?	
	I	The zoo is actually there to, to, to ensure that animals are looked after and they are protected and also to ensure that now people are getting education and to create awareness around environmental issues.	Purpose
7	R	Do you think that zoos are contributing to the conservation of endangered species?	
	I	Yes, of course, the zoos they contribute largely to conservation of endangered species like we've got rhinos, we've got the ground horn bills. Those are the, the some of the animals that are endangered and we have issues in the wild dogs. The zoos they play a very crucial role in that aspect.	Purpose
9	R	Do you think that the zoo serve the best interest of animals?	
	I	It depends, but in most cases, you know, zoos they look after animals in such a way that now the welfare of animals be considered and their health and the different kinds of food that is given to animals. You know, it shows that, uh, the zoo cares for animals in a more sustainable way. And also if we look at the hospital that's been there to make sure that now whenever the animals are not feeling well, there is the vet that can attend those animals. And that is an indication of the broader concerning view that the zoo is having on sustainable protection of the animals that is in the zoo.	Impact
10	R	What is, uhm, we talk about impact. That is a change that you want to see in the people you are working with, in the communities. What is the impact you want to see with your programmes after a long period, of say ten years?	
	I	Ja, 2e want, especially with the ZooClub is the one that we want to see an impact in a very long run. And it	Impact

		is when you, because of the kind of activities that is being designed for the ZooClub members. I a mean to, to, to assist them in, in the greater awareness of science so that the learners can pursue careers in the science field, and which of course is very scarce careers that we are having in the country.	
11	R	Ja, OK great. And for a shorter term like a outcome after one or two years a mid-term of four to six years, what, what that is more immediate outcome.	
	I	More immediate is basically on the knowledge that they acquire and that they can apply	Short outcomes
12	R	You want to see an increase in knowledge and maybe skills in science?	
	I	Yes.	
14	R	Science in general or just conservation. Where is your focus?	
	I	It is conservation and science, you know, because you know in this field you cannot separate the two.	
	R	Because you need to know the science skills to study conservation in the end?	
	I	Yes.	
15	R	Uhm. We already mentioned your programmes and your outcomes we did talk about. Do you think that the Conservation Education programmes that we are offering at the zoo, not just yours now, all the programmes. Do you think they achieve what they are intended for.	
	I	Uhm. The Conservation Education that we are offering at the zoo it does actually achieve to a certain degree it does. We are objective but there are some few challenges that we find, you know. Because of, huh, availability of different species in the zoo, and you know sometimes people want to know about a particular animal that is not there and in the zoo it is difficult explain, you know, when we don't have a particular species.	Evaluation

17	R	Uh, do you evaluate the impact of your programmes, the programmes you are offering?	
	I	Ja, well we do. We have some evaluation tool that we are using to to to determine uh, the knowledge, the behaviour and attitude of learners.	
18	R	Of your youth courses?	
	I	Of the youth courses. The learners will be given the form to complete, and that form will tell us exactly what kind of attitude or behaviour the learners are having relating to the engagement.	Evaluation
19	R	You are also busy with your Master's degree in Environmental Education?	
	I	Ja. I'm busy with the Master's degree.	
20	R	And what are you going to focus on?	
	I	I'm focusing on the invasive alien plants.	
21	R	That is a project that you have with the ZooClub?	
	I	Yes, you know this project it was developed while I was in Germany and when I come back here I started implementing I started to take it further into my studies because it was a very important aspect. And the learners also I've seen they benefited from this alien invasive project that I have. It has helped them to understand how they can approach other projects and activites.	
22	R	Fantastic and something else I want to ask you is do you think, you work a lot know with your ZooClub on a long term basis, you'll see these children, in the end maybe you'll have them for five years, or from grade 7 to grade 12. So it is a long time that you work with them. Do you see a change in them? If you take a child when they first started to work here and at the end of their career. Do you think that you are making a change in their lives?	

	I	<p>Ja. Definitely, I've seen a lot of students, you know, starting, entering uh the programme at grade 7 level, as they progress up until grade 12, I've seen how they grow and how they are inspired and they are getting interested in the zoo's activities. And some evidence, now to show, to show that there is a long term impact is most of some of the students we have identified them into different institutions. For example I've got one, uh, two students in the University of Pretoria. One is Diva she is studying to be a vet and a scientist and then I've got another in UJ in microbiology, and I've got two of the zoo, the previous the former ZooClub members in Onderstepoort doing uh uh vet science there. So those are some of the, the, the encouragement that I see that the learners are trying to develop over from that period of grade 7 up until grade 12 and beyond that. So it is a lot of, eh, growth and indication of sustainability.</p>	Impact
24	R	<p>Do you think, you also work a lot with conservation issues, uhm, with your ZooClub members. Do you think that these children will go into their own communities, maybe talk to their parents and also spread the word of how important it is, it is conserve species. Do you think they take it home?</p>	
	I	<p>Ja, they they do take it home because you know recently we had a rhino campaign which was also initiated by the ZooClub with other, with other stakeholders. So I've seen how they, they the kids actually have eh, informed and encouraged the parents to participate in the parade. And that was a very nice thing, and then also in their school communities. They also invited other learners who were not ZooClub members to become part of the, eh, the, the the march. And to me it was an indication of them actually conveying, transferring messages, conservation messages, to their communities.</p>	Impact
25	R	<p>Uhm. So, do you think that your programmes are worthwhile in uh, in term of the money that the zoo is spending on it?</p>	

	I	Ja, the money is a very serious issue. You know sometimes you find the money that we are spending on the project is not so enough because there are so many things that need to be uh actually achieved. So, with the money that we are having it is very limited.	Weakness
26	R	You feel that the zoo can actually put more money toward the programmes.	
	I	Ja, that's my feeling so that we can reach more kids. The money issue also involve like sponsoring, you know, adopted schools, you know where the kids are disadvantaged and they can be able to participate in this programme and in that way we can, we can built more capacity.	Weakness
27	R	Ja. Do you feel that the programmes you are offering is worthwhile in terms of all the input you have? If you look at all the energy you put into this and what you get out of it in the end?	
	I	The energy that I'm putting is equivalent to the output, you know, because I'm enjoying myself you know. It is not like work. I'm enjoying myself and I can see how my investment, the time I'm investing in the programme its relating into work but I'm seeing the kids developing and achieving certain things and I can now be rest assured that there are lots of indicators that it successful.	Inspiration! Strength
28	R	Do you think that your programmes are sustainable in terms of the support you get from your management?	
	I	From the management there is a lot of support that I'm getting and lots of support and encouragement , you know, and those are some of the things that makes me feel that the programmes are worth it to benefit the youth at large.	Strength
29	R	Do you get enough support in terms of administration, and updating of your information.	
	I	Ja , we are working in collaboration with guest relations officer and also we have our own administrator who is keeping record in terms of the money that we are bringing in and the update of the members and also the	Strength

		newsletters. When I need to compile newsletters they provide me with the necessary resources to enable me to do that.	
30	R	Do you feel that you get enough exposure with your programmes in the media?	
	I	That is a very serious problem that I am having. There is not much of exposure in the media. The only platform that we are having is the website that is used regularly, the website, and very limited people visit the website, you know. I can say that I'm feeling we need more exposure to that.	Weakness
31	R	The programmes that you are offering, do you consider social responsibility requirements in that?	
	I	Ja, well I'm not sure if I understand the question very clear, but social responsibility is, is what is that in the zoo?	
	R	Do you support, maybe ZooClub members from poor communities in that you will offer free of charge membership and do you work with members, children from poor communities?	
	I	Ja, that one we are trying but it doesn't work because I went to different schools to give the principals for free for attending the course, but they challenge is the travelling of the kids and the food that they must eat at the zoo and its money that the parents don't have. So most of those social responsibility initiatives that I'm trying to bring on board, they fall flat because of the challenges of transport. You know, to offer them a free course is not a problem the problem is to get them to come and attend.	Weakness
	R	So you would feel that maybe some funding could be put towards that?	
	I	Yes, if there was funding for these kids, maybe we are identifying kids in potentially different schools and there is funding for them, maybe a grant that will help them with transport and food because we are offering the course for free.	

32	R	Uh, is the zoo's name visibly at activities, workshops maybe that you attend, and for example certificate ceremonies?	
	I	Yes, we are using banner to show the NZG's logo and their vision and mission statement. You know, that is very visible. Whenever we are engaging with the public we make sure that we, the zoo logo is visible enough.	Strength
33	R	If, if I would ask you why do you think, if we talk about your management, and maybe the NRF, the government, why would you want to say do they have to give you money for your programmes?	
	I	Ja, I think, eh, eh, the government, because we have are having a lot of youth who is unemployed, I think it is, it is worth investing in this kind of a programme that I are doing at the zoo because that is going to be part of the ensuring that the kids are well developed and they've got, they can choose careers, you know, informed by, by different things that they want to do, and also, you know, if the government is putting more funds, if the NRF is giving money for this kind of activities, we can also reach out to other communities and in the end that we, we can have them even the learners you know, to perform better in their formal school system because they've got exposure, they are having more support, you know envisaging for instance careers. There are people coming in to inform learners about the different careers and that is the only platform they are getting so much exposure that I can assist them as they progress with their school career.	Impact
34	R	Hmm. You have to work with other, presenters to present your holiday courses for example. Do you think these people that you work with, volunteers and youth course presenters are able to manage and present and programmes well enough, and how do you know that?	
	I	I'm having presenters that I'm involved with, there is a training that I conduct to make sure that now they,	Training

		they understand the subject matter and I go with them through different processes. They should know the SOP's, the standard operation procedures in terms of how to handle the learners, what to do with the learners, you know, with the activities you know. What they are doing is part is of their training and they are evaluated for competency purposes to ensure now that they are able to do what they are, they are expected to do during a course.	
35	R	How do you make sure that the content of the programmes you are offering are clear to the learners?	
	I	Because we have the different programmes, we got foundation phase and intermediate phase and senior phase, so when we design, when I design a programme, I make sure that now, I look at the, the curriculum on the other side and I try to adopt some of the element of the curriculum, so that the zoo can be best able to express and incorporate in the programme. The learners, already they find it very interesting, to to engage there.	Quality
36	R	Ja. Do you have enough resources for your courses?	
	I	Ja, resources, we do have resources, but you know resources is you always have to keep on improving and bring in new resources to make sure that now as we updated the programme, we, we bring in some new resources and high ideas to make sure the programme is now becoming very entertainment to the learners.	Strength
37	R	Do you include satisfaction surveys in your programmes?	
	I	Ja, that is when you want to find out from the parents...	
	R	If they are happy?	
	I	Ja, if they are happy. You know, when the parents come to fetch the kids we normally give them a, it is kind of an evaluation form, to tell us how they think, from the beginning when they start to see the programme on	Evaluation

		the website, when they phone for their kids, the reception and all those kinds of things, you know. Because you will normally find that parents would want to feel very comfortable when they leave their kids at the zoo. And safety is the main important aspect. Even after the programme you'll find me at the gate making sure that now everybody is, all the children have been collected by the parents.	
	R	You yourself do that?	
	I	The presenters they are still actually doing the logistics with the parents but I'll make sure with the security issue that the kids are very safe.	Strength
38	R	And your presenters, do they give you reports and do they give you feedback?	
	I	Ja, feedback we usually have that at, at the end of the programme. And maybe a week after the holiday courses just to see what were the challenges and if there is any challenge we try to adapt, to adapt and see how best we can change it.	Strength
39	R	Do you think the programme you are offering is worthwhile in terms of the money the zoo is spending on it?	
	I	Ja, I think the zoo is a resource centre and the money they are spending on this programme is worthwhile, you know.	
40	R	Uhm. Your programmes, does it involve support to teachers also? Teacher workshops?	
	I	Ja, well, teachers workshops is when I go in just to present and maybe an aspect just to create awareness for the teachers so that they know there are certain programmes that I am offering.	Input
	R	That you are offering.	
	I	Yes, and that it can be very beneficial to the teachers.	
41	R	We already talk about this. Do the zoo have a written education policy?	

	I	Ja, when the, the education policy uh, in terms of what the zoo wants to achieve, it is there.	Input
42	R	It is there, and a strategic plan?	
	I	Ja, the strat plan is there.	Input
43	R	Ahhh, what are your plans for Conservation Education?	
	I	Ja, my plans for Conservation Education is, you know to see, that, to see that in the end of the day, the most of the learners get exposure, understand conservation and they are able to apply it in their communities, and they are able to use it, you know as a background when they pursue careers and it might be maybe science or it might be, eh, economics or anything, but they should be able know that now, it may be the key, core aspect this environment. Because all this entities and disciplines the are centred around conservation. Even law, you know they should know about laws, conservation laws and everything if a child wants to pursue that area. If they want to go into, into economics they should know about, you know, resources and productivities and all those things that are informed by the environment and conservation issues and resources.	Impact
44	R	Do you think there is still a place for a zoo in today's societies?	
	I	Ja, zoos play a very important role. A very important role. You know, they look at the research aspect of the zoo, if you look at the education, recreation and conservation. Those are the key fundamental issues of the zoo and those, you know, in a modern area they are coming very strong in those aspects.	
	I	OK. Thank you very much. That is all for today.	

***End of Interview**

Zoo: Zoo Negara

Zoo Negara 1 Interview – Education Manager (M2)

Interviewer: I

Participant: P – Education Manager

***Start of Interview**

Q			Coding
1	I	Good morning, Junaidi (sic), and thank you so much for making time available for this interview, I really appreciate it. Can you please tell me what is your position here at Zoo Negara?	
	P	My name is Junaidi (sic) Omar (sic), I'm a head of education department of Zoo Negara Malaysia.	
2	I	What does your job description imply? What is your job here? What do you have to do?	
	P	I have to managing the education department stuff and also I have to make a proposal for development of the education plan for the zoo, and also, apart from it, I also engage with discovery programmes , planning the modules, together with our education staff, and also we have designing the education printing materials , like leaflets or workbooks or worksheets, posters and also teaches kid .	Input
3	I	Oh okay. And what does it teach your kids –	
	P	Just to help the teacher.	F
4	I	...does that include worksheets or what?	
	P	It includes worksheets , it's all the props that teacher might , tools that teacher need to educate their children when they are in the zoo. And then the letter, actually, we are just printing out the zoo explorer worksheet , so there's a new programme for the zoo together with the education staff, so we printing out and also we get	Input

		our zoo visitors, family members and also school children.	
5	I	Do you work closely with your department of education? Do you link with the national department of education?	
	P	Are you talking about the ministry?	
6	I	Yeah, the ministry.	
	P	I see. Yes in fact, I just met up with them recently regarding on our teacher workshop programme in the zoo and, of course yes, we have to have a link with the ministry of education and in fact we discuss with ministry level regarding on the curriculum module, specifically on the science syllabus that we can deliver or share with them what we can offer into the syllabus of Malaysian curriculum.	Output
7	I	Do you, as the education department, have a written education policy?	
	P	So far we do have one because Zoo Negara Malaysia is an ISO, documentation records, so every steps or every protocol procedure that we are going to phase through, we have to follow a certain rules. So we do have a standard of procedure in our department, and yet for the policy we would like to have it but we don't have it currently yet.	Input
8	I	Okay. So you are working on that one. But do you have a strategic plan that you work with, education strategic plan?	
	P	Yeah, we do have our planning for the education, because the strategy that we are going to phase in this year that we would like to have details up on this our discovery programme and also our volunteer programme that we conduct and we are looking also for an outreach programme that we go to school, to malls, to the public area and we do also wanted to have this zoo and botanical library.	Output

9	I	Okay, ya.	
	P	And the zoo gallery—	
10	I	Ya...	
	P	And also we conducting the zoo conference workshops, courses and awareness events .	Output
11	I	Okay, so you have all that planned ahead of you for the next year. What is the...when you say the zoo gallery, what is that? Please tell me more about that?	
	P	Okay, this is more on long term planning, so we would like to have this exhibit on the...not only for the live specimen, but we do want to exhibit the dead specimen. Dry specimens. Artifacts. Biofacts. The animal footprints maybe. And then the herbarium for the teaching. Herbarium more focusing on the plants and for teaching tools, perhaps for these research purposes so those we say they want go to the...I want to learn more about the zoologies and zoonarctic and also herbarium, perhaps they can come to Zoo Negara to have a look at our future zoo development.	
12	I	I appreciate the fact that you include a lot of plants as well, that you don't just focus on animals.	
	P	On animals, yeah.	
13	I	But you look at the whole ecosystem. Tell me, what is the intended change you want to see in the community, meaning the impact that you want to see Zoo Negara achieving, after say a period of seven to ten years.	
	P	Nowadays people tend to go to the zoo as part of their educational activities but we would like to have to instil more awareness among the visitors, among the people out there . They are supposed to think of...the zoo should be part of the learning of the education activities that they can conduct, they can bring their	Impact

		children, they can bring their relatives to the zoo. While having fun they also can learn more about animal kingdom.	
14	I	Okay, so, what would you say are short term outcomes that you want to achieve with your programmes, the Conservation Education programmes?	
	P	We would like to have to educate, to spread knowledge on wildlife awareness to people of all ages and then also we would like to have... provide a platform for them to learn, and also for those international learning institutions to come to the zoo as an outdoor classroom, and also to give a chance of exposure for knowledge and also a better understanding about wildlife management and also to provide resource centre and interpretive display facilities in the study of wildlife	Outcomes
15	I	Do you achieve these outcomes?	
	P	Yes. We achieve all the outcome that we targeting.	
16	I	How do you know that?	
	P	Because we have these feedback from the customer and, focusing on one issue, we have one programme, discovery programme so we do receive return visit from them or even from our volunteer programme so we have the regular volunteer come to Zoo Negara, and also by looking at the feedback the feedback they give us, so they are very positive in returning their visit to Zoo Negara next year.	Evaluation Output
17	I	That's great. So do you evaluate all your programmes?	
	P	Yeah. We do evaluate our programme. So after a certain session we have a assessment form, so we distribute to all the audiences that we are facing through and they give a comment and also feedback for all our programmes in the zoo.	Evaluate

18	I	And then what do you do with that feedback, do you make changes in your lessons because of the [CROSSTALK].	
	P	We analyse it and then we have a brainstorming session, debrief session, among our team and we do some changes depending on the..	Analyse
19	I	If needed.	
	P	Request, and needed from the audience. And also, can I?	
20	I	Yes, carry on.	
	P	Before the visit, normally we do a pre-discussion with the coordinator and also among the teachers that what we can help to customise their learning activities to suit into their curriculum in the classroom.	Strength
21	I	Where do you still see your programmes improving? Where do you think you can still improve, perhaps? Where would you like to do more, make a bigger impact?	
	P	Okay, the programme that we planning, actually it's focusing on the curriculum syllabus with the...from the ministry of education and of course we have to see the capability of the audience and also the age group before we draw the programme in order for us to ensure that the programme is successful and also benefit to all the audiences, so we have to consider on the age group, we have to consider on their capability, whether they are in a very fast learner or slow learner, and also their capability in terms of they have any physical challenge or mental challenge, so we have to consider that as well, before we draw the programme for the education.	Strength
	I	So you want your programmes to be more inclusive of children with specific learning or physical needs.	
	P	That's true.	

22	I	Well that is really nice. [CROSSTALK].	
	P	We do have special needs audience that comes to the zoo and also we have request a certain language like Mandarin so we will always communicate with the teacher and coordinator for them to assist and also to make sure that the students will understand what we are delivering to them.	Strengths
23	I	Do you think that...or to your perception or because of your evaluation that your education programmes here at the zoo are making a difference in the community?	
	P	Most of the audiences are from school children, and also we do have from the local community as well. So far, when we see their response towards the visit, so they give us instantly pleasure that they are really enjoy and they really understand what we are delivering and of course I'm sure if more public or more audience will come to Zoo Negara just to seek for the knowledge, I think we can give a big impact to the community.	Impact
24	I	What is your personal opinion of the role of the zoo...that the zoo can play in Conservation Education?	
	P	To be... I believe that education is the only key in creating awareness on wildlife conservation. So we would like to carry out as an important pillar for the public to raise knowledge, to gain experience by visiting us. So, to me, from my point of view, when people see the education is the main subject for them to deliver or to share the impact of knowledge that we can provide, so I'm sure that we can make a difference because now the environmental and also the element of wildlife is a very good icons for them to learn about this conservation message.	Purpose
25	I	How do you see the roles of zoos in conservation?	
	P	It's very important. It's very, very important. Because the zoo establish is all about conservation and also	

		<p>about education and we do research training and also recreation, but without zoo to me it's very hard for us to have a infinite breeding, have an exchange experience handling animals, trainings and also of course the important thing is the...to educate the public out there, that we have this platform for them to learn about wildlife management.</p>	
26	I	That's great. Do you think that in today's society...modern society that there is still a place for zoos?	
	P	To me, in this modern society among the mindset of the community, they know that the zoo is there but then sometimes they just think of the zoo is for them to just leisure, to just have fun, but not really know what is the function, the real function of zoo establishment.	
27	I	So do you think that we must continue having zoos or must...because some people are of the opinion that we have to get rid of them?	
	P	<p>Yeah, we should continue having zoo, it's just that when we have the mentality that...the zoo is the [INDISTINCT] programmes, so it can be a place that you can see, you can do research and you can educate your children, and you do have to conserve certain species of animal that lack or maybe lessen, become lesser and lesser. So you should have the zoo, and you should support the zoo.</p>	Place
28	I	Do you think that what you put out there, in your education programmes, that your programmes are worthwhile in terms of the cost...the money you spend on it?	
	P	<p>Yeah because, our programmes is most of [INDISTINCT] and we actually...we spend a lot more on delivering the knowledge, it's just that we have a minor part on this, the fees of the entrance fee and so we are using the train, but not every programme we have that, the train facilities, and also some...it depend on the audience budget. Some maybe you can customise into a low price, but then the important thing is the</p>	Input

		knowledge that we want to believe—	
29	I	So it's that human part that you put into...your time from your education staff?	
	P	It's sufficient, so far, it's just that to add on into the activity, maybe you can supply some souvenirs or some painting like [INDISTINCT] and everything just to support the cost, but it is a very minimal cost.	
30	I	Are your programmes worthwhile in terms of the results you are getting?	
	P	You're talking about the results?	
31	I	The results meaning the impact you make and the outcomes being achieved and what you can...the way you can support your education system, do you think it's worthwhile?	
	P	Ya, for our...in fact in two thousand nine since we establish this discovery programme, so we do have profit that we can put back to our zoo funding and, yes, we actually...we are looking at that perspective as well, because being as an NGO so we need fund, we need a lot of fund, we need a lot of money to establish and everything. So I think the education programmes, we can supply some little bit fund by conducting the discovery programme and also we do some fundraising like we have face painting activity so we do...we got donation from the public that donate to us and then also the profit that we have in the education programmes [INDISTINCT] we can give back the zoo and it slightly doubled in numbers in two thousand ten, so we have that	Input
32	I	That's brilliant! Are your programmes in line with your social responsibility requirements?	
	P	Social programme?	
	I	Social responsibility meaning if you have poor communities, do you give them a reduced rate or free entrance?	

	P	I see. Basically when we draw the programmes, so we looking at also the background of our audience like the economical values. So if let's say we have these limited social community, so we do encourage them to find a sponsor to assist them in getting our programme and then sometime we do discuss with the coordinator that maybe we can arrange something that suit or meet the budget.	strength
	I	So you will give them a reduced rate?	
	P	But we still attending the school because the knowledge –	
33	I	[CROSSTALK]	
	P	Ya, the knowledge, we still attending this.	
	I	Do the programmes provide marketing possibilities for you, meaning will you use a specific programme you are offering, use that to advertise the zoo.	
	P	Yeah, actually every education programme or any discovery programme that we conduct we need marketing team, we need a marketing value to announce, to add on to the value of our programmes, so basically to me it's very important to have this factor to project more impact through the audience that we have this programme.	
34	I	And are you happy with the support the marketing department gives you as the education department?	
	P	So far yes. We do have a collaboration always, especially on the awareness events and I'm quite happy with the contribution from them.	Strength
35	I	Is the zoos name visible during launches and workshops and certificate ceremonies and on your worksheets and so on? Meaning your logo and the zoo's name, do you make sure that this worksheet now is from the zoo?	

	P	Yes, this very important, because in terms of marketing value, and also you want to highlight our organization, we printing out every and each single pages that we have this logo where we announce all the companies of the organizations logo for the public. It's very important that one because we have a sense of belonging and then we are representing the organization.	Strength
36	I	Say you were to apply for funding, from the government or from NGO or from the public, why should your programmes be funded? What will you give as the reason?	
	P	Because looking of this knowledge. So basically our programmes we would like to have a contribution from everyone, so when we have why you should funding our programmes, because our programme is...we cater for all ages. So there is no way for you to not contribute to our programme because it's for maybe your elective, for maybe your future children, so I think we should put there.	Purpose
37	I	How many education officers do you have working for you in your department?	
	P	Currently I have five officers involved in this unit, in this programme, so I have these learning officers and also I have these art creative centre, so I have one officer, and also I have resource centre, I have this training and I have research. So I have five different units, so every five have officers in charge.	Input
38	I	How do you know that your officers, your education officers, are able to present their lessons well?	
	P	The lesson?	
39	I	Do you evaluate them, do you monitor them?	
	P	Being as a manager, so yes I always meeting up, I always brain storm, in fact we have a weekly meeting, so we would like to have a teamwork in the department, so even I do follow ups and I monitor and sometimes, let's say, if they need more sources, so I'll be there to assist them.	Training

	I	In getting them.	
	P	So I will always communicate with them. [CROSSTALK].	
40	I	So it seems like a group work –	
	P	It's a group work –	
41	I	...and good communications.	
	P	It's a teamwork, it's a team players, yes. [CROSSTALK].	Strength
42	I	But how do you know that the content of your programme offers specific lessons? How do you know that that is clear to the learners?	
	P	Because in our practice in our education department of Zoo Negara—	
43	[BR EA K IN AU DI O]		
	I	Okay, you can carry on.	
44	P	You want to repeat your question?	
	I	Let me just see if I'm recording, yeah it's recording. Okay so [INDISTINCT] how do you know that the content of your lessons are clear to the learners?	

45	P	Actually adding to that as well before that, we do have training session, we do dry run and also we conduct a rehearsal of the programme so that we have to evaluate among our team first before we deliver.	Training
	I	So you do the lesson just between your staff [CROSSTALK]?	
46	P	Just between my staff or maybe we can pick up certain audience that we want to, to just try and—	
	I	And they will give you comments?	
	P	Give comments and feedbacks before we deliver.	
	I	That is a very good way of doing it. The only zoo that I have been to now so far that's actually doing that. So you will do the...present the lesson to your staff members, and then make changes.	
	P	We do in house training first, before we deliver to the real audience.	Training
	I	Okay, but the content of the—	
47	P	The content, yeah. We have a guideline. For example when we do a briefing for the volunteer, so we have a script for them to follow, maybe just a guideline, and then after that we train the staff and then they will train in front of me and then after that I will release them.	Training
	I	Okay, and do you ask during the lesson, would you ask the learners questions, to see if they understand?	
48	P	We give a... I mean we brainstorm and we debrief and also discuss about what we should have given them and then if there is anything that we need to put in.	Training
	I	But how do you ensure that the quality of your learning support material, the props that you've shown me and your worksheet, that they are of a good standard?	
49	P	We have to hear feedback from the customer of course then we know how...and then the responses from the audience that we conduct in the programmes.	Quality control

I	Your education officers, do they have to supply regular reports to you?	
P	Yeah. We have to submit every month report to the director and of course when I am doing the reports...so I will ensure that just to alert them, so to submit to me, whatever they thought I need, especially for the discovery programme, how many schools involved, and also what kind of school involved and also how many profit that we gained, and also like for the signages, how many signs, how many poster that we already printing out. So all of the list then I will compile it, and pass it to the management. We do every day updates.	Quality control
I	Do you feel positive about Conservation Education?	
P	Very, absolutely positive. Because the Conservation Education is the main issue here in the zoo. Without this I think I'm not sure.	
I	[CROSSTALK].	
P	[CROSSTALK].	
I	I think there are certain links between Africa and Asia and also, not just on a socio economic scale, but also because of the biodiversity we have. That's actually the reason why we are involved in this study but, instead of that, I was thinking in the line of perhaps having a Conservation Education programmes where we have animals that's being poached in South Africa because there is a need for certain products that you can get from them in Asia, like Rhino horn, so as long as there is a market for Rhino horn in Asia, the rhinos being poached will be kept on poaching. How would you feel if we can then start on a collaborative Conservation Education programmes between my zoo and your zoo? Do you think it's a good idea?	
P	To me, by joining...joint venture with two different organization, even two different worlds I think, it's a	Opportunity

		brilliant idea because, for us, we cannot do our business alone. We need more people, we need more hands, we need more helps from others.	
	I	We have to join hands.	
	P	Yeah	
	I	Thank you very much for your time, it was brilliant, thank you so much.	
	P	Indeed, I am touched and pleasure having you in Zoo Negara.	
	I	Pleasure, it's nice of you be here.	

Zoo Negara 2 Interview – Education Officer (O4)

Interviewer: I

Participant: P – Education officer

***Start of Interview**

Q			Coding
1	I	What education programmes do you offer to school groups (on site)?	
	P	We offer various programmes age from preschools, primary school, high school, University to the public of all ages. Special needs are also included in our programmes. From general guided tour on foot, any focus themes like Malaysian Endangered animals, frogs to University level.	Input
2	I	Who was responsible for the developing of these programmes?	
	P	I helped to develop the modules and brainstorm my ideas with the Education team before I execute the	Strength

		programmes	
3	I	For what age groups are these programmes intended?	
	P	From 3 years old and above.	
4	I	What process was used to develop the programmes that you offer to school groups?	
	P	I do research on programmes from other zoos for ideas. I also discussed my ideas to my team. We will develop the teaching props together. As it is a zoo programme, it also involved the Zoology department. Whatever programmes we do, we will also consult the curator.	Strength
5	I	What are the goals and objectives of your programme?	
	P	The goals are to increase the knowledge and appreciation of wildlife and its surrounding in people and the objectives are to provide a platform for outdoor classroom and educational tool on wildlife topic for learning activities.	Long outcomes Short outcomes
8	I	How are these programmes linked to the school curriculum?	
	P	I will look through the school curriculum from the Ministry of Education, use the national school textbooks as reference, and most of the time, I will discuss with the teachers prior to their visit to the zoo on the theme which the teachers are teaching in the school and link my teaching in the zoo's programmes.	Strength
9	I	Are these programmes evaluated, and if so how are they evaluated.	
	P	Yes there are. We give the teachers evaluation form to fill in. Sometimes, we get verbal feedbacks on what can be improved and what is done well. Only through these evaluations, we are able to ensure that we give our best in our teaching.	Strength, Evaluation

10	I	If you were to evaluate these programmes how would you best evaluate your programme?	
	P	Teacher's feedback is the best as they are our main clients for the Education programme. And of course, having the same school coming back the next year shows that the programmes are good.	Strength Evaluation
11	I	Are you part of the developing process of these programmes? Do you get training in presenting these programmes?	
	P	Yes. I was given an opportunity to attend a 5-day Environmental Interpretation workshop organised by FRIM.	Strength Training
12	I	If so, who trains you? What difficulties do you experience in presenting these programmes?	
	P	I was evaluated at the end of the workshop to see how well I did. Difficulties experiences in presenting will be basically presenting in Malay language as I am much comfortable presenting in English, another difficulties will be some teachers tend to let the Zoo officers to 'babysit' their students while we conduct the programmes.	Weaknesses
13	I	Do you provide your programmes to schools that have made bookings? If not how do you target schools?	
	P	We promote our programmes through the Zoo's website and also teachers who call the department to enquire about the programmes. We will book a date for teachers who are interested in it.	Strength
15	I	Are the presenters (education officers and volunteers) able to manage to present and develop these programmes well?	
	P	Currently, presenters are only the education officers. Prior before any officers conduct the programmes, they will have to go through certain training sessions conducted by either me or my supervisor.	Strength/Training

16	I	How do you know if your programme content clear to the learners?	
	P	Before we conduct the programme, I will have plenty of communication with the teachers. A tentative with specific explanation will be sent to the teachers. The objective of the teachers to visit to the zoo will also be discussed. On the day itself, we will usually ask the students questions to ensure that the message given to them is clear. Aside from that we use Tilden's principle: provoke, reveal, relate, children, and art.	Strength
17	I	How do you know if the quality of the materials used for the programme is of good standard?	
	P	Working as a preschool relieve teacher before, I put students' safety and hygiene as one of my top priority. I always ensure that the students wash their hands before and after eating/ petting the animals. Not only the materials used for the programmes must be safe and clean but also in any case where animals are involved, I ensured that things safe for the animals as well.	Strength
18	I	How do you know if the materials are user friendly?	
	P	Mostly, our teaching materials are mainly visual aids. Before getting any materials for any hands-on activities, I checked with the teachers on allergies from the students or the sign 'halal'. If it is the first time we use the materials and the teacher thinks that it is inappropriate, we will seek for the teacher's advise and be more cautious the next time.	
19	I	In the ideal world how would you change this programme?	
	P	In terms of and what resources – able to work with the Ministry of Education whereby the department can easily approve the school to take the Zoo's programmes. Teachers who are interested to take our programmes need to do plenty of paperwork and this often deters them from taking the package. Make it at least a one-day programme. There will be no rush and everyone is able to enjoy the zoo while they learn.	Weakness Recommendation Weakness

		After all, only by having fun that learning can be instilled. And funding from the Ministry of Education will make a lot of difference especially students from poor family background.	
23	I	Does the programme prove to be worthwhile in terms of money spent on it?	
	P	I would like to think that way.	
24	I	Do the education programmes at Zoo Negara achieve what they are intended for? Are the goals achieved?	Output
	P	Yes	
25	I	Are the outcomes achieved?	Outcomes
	P	Yes	
26	I	Are the impacts achieved?	Impact
	P	Yes	
27	I	Do the programmes make a difference in the community?	
	P	Definitely. It is a different experience for everyone as we conduct our programme 99% outdoor.	Long term outcome
28	I	If you were appointed head of education, and you can change one thing, what would it be?	
	P	Budget. I would like to have more money to get more teaching materials and also travelling allowance to be able to see how oversea zoos' conduct their programmes/ attending international conferences.	Recommendation

Zoo Negara 3 Interview – Deputy Director (D3)

Interviewer: I

Participant: P – Deputy Director

***Start of Interview**

Q			Coding
1	I	Good morning doctor.	
	P	Good morning, yes.	
2	I	Can you please tell me, what is your position here at Zoo Negara?	
	P	I am the deputy director of the zoo.	
3	I	That's great, and how long have you been in this position?	
	P	It's just well over two years now, actually my total year of employment in Zoo Negara is about five years. I started off as a vet, and then slowly I worked myself up to become the deputy director.	F
4	I	In management.	
	P	Yes.	
5	I	Well, congratulations, because a few years' time I saw you, you were a vet here.	
	P	Yes, thank you very much.	
6	I	And now you have this big, beautiful office. Tell me, what is the impact that you want to see in the community from Zoo Negara's side?	
	P	Well, basically, when my boss comes into the zoo, because he came in just two months ahead of me...my boss means our president, so what we aspire Zoo Negara to be, we want to be a world class zoo. There's	Purpose

		<p>certain criteria that we have to achieve, and of course most zoos in the world, our activities, every zoo in the world centre around five. That is conservation, recreation, education, research and training. Why conservation becomes the first one? Because that is what we do. That is what we are supposed to do, and the next should be education. And why we put recreation, because I think there's a study that is been done in two zero zero eight, of the seven hundred million people that comes into the zoo worldwide, ninety eight percent just want to have a good time in the zoo. Only two percent concern about conservation. And then Zoo Negara, being run by an NGO, we need money to run the zoo, so we not...I'm not saying we really focusing a lot on recreation, but that is how we get in people.</p>	
7	I	What your public wants?	
	P	So fortunately we have about close to about one million people that comes into the zoo, yes, one million people.	
8	I	How many of that is school children, school groups?	
	P	Last year we have about close to one hundred and eighty thousand school children.	
9	I	That's great.	
	P	Then basically the target audience of Zoo Negara is children below twelve.	
10	I	Below twelve?	
	P	Yes, because we believe that children get more excited, they are much easier to either teach or educate, or even create certain awareness, whereas the adults are quite difficult human beings, they do not...they're not really...they...if you want them to change, they will not, unless they want to change, but children we still can mould them, we give them information, they are able to think and probably when they reach	

		adulthood...because they will be our advocates of wildlife conservation later on. Because these children will be ministers...will be so—	
11	I	Exactly, the leaders.	
	P	...the leaders, sort of. So we are focusing on that.	
12	I	So, you talked about complying to certain standards, so you are...are you a member of WAZA?	
	P	Yes. We are, I think, in Malaysia we are the only member of WAZA.	Strength
13	I	Is it?	
	P	And of course regionally we are affiliated to the South East Asia Zoo Association, which is called SEAZA.	Strength
14	I	SEAZA?	
	P	And then locally we have our Malaysian Association of Zoological Parks and Aquaria, short for MAZPA.	Strenght
15	I	MAZPA?	
	P	And in MAZPA there are currently seventeen members which comprises of the main zoos and the main...what do you call it? Aquarium, like Underwater World, Lankawi, Zoo Melaka, Zoo Taiping and all that. So, in total, roughly we have close to about forty of those theme parks in Malaysia, so what we are doing is we are going on a membership drive, but to be in MAZPA there are also certain guidelines. So much so MAZPA's guideline is similar to WAZA's guideline in case, that is why now we are...there is only seventeen of us.	
16	I	Well, it's good I think for you to aspire to be accredited by WAZA, that is a great thing. If you can tell me perhaps, I don't know if you have one, a vision statement?	
	P	Well, basically Zoo Negara we are also with ISO nine thousand one, so meaning if you have...if you want to	Input

		reach a certain standard, you must have a vision and a mission, but for me to tell you now, because it's a very lengthy process, so it's very lengthy. But in, to summarise, it's basically like I mentioned earlier the five functions, now we'll continue to improve on that, improve in terms of our service which is how we exhibit animals, how we educate the public, conservation wise, and then research and training wise. Research and training is basically, we do accept university student for internship, and then training means we continuously train our staff, because in order to be a world class zoo...if you look at some of the major zoos, especially, let's talk about US, a lot of the keepers are basically graduates, whereas in Zoo Negara, still some of my keepers do not even know how to read and write.	Purpose
17	I	So you have adult training programmes.	Strength
	P	Yes, we have adult programmes.	
18	I	That's good. Tell me, if you would say, do you think that you are achieving your goals?	
	P	Oh yes, because every year we have...we call it a key performance index, which is KPI for short.	Input
19	I	KPI, yes.	
	P	So basically each department, ever since we have put in place ISO nine thousand one, they have to come up for a KPI for each individual section, because in order for you to have a vision and mission, there must be some measurable goals. There's no point of just talking, I want to be a world class zoo, but there's no small goals. No matter how small it is, it must be measurable, attainable, realistic and it also depends on...we in management...I mean people in management have a tendency to plan on paper, but for in our case, we go down to the ground, meaning we must make sure that what we want to do, our staff down there must be able to support. There's no point that you want to be a very high class, but your staff down there is left	Strength – lot of focus on staff training

		<p>behind. So among our staff, we do the gap analysis, which is we test them on their attitude, skills and knowledge. So we work on that, and when you mention just now, are we where we were supposed to be?</p> <p>Yes we are.</p>	
20	I	Do you evaluate your impact you have in the community at all?	
	P	<p>Oh yes, normally, it just started quite recently because we just got our ISO nine thousand one in the year two thousand and seven, so everything has to be documented. If we have a family day, school trips, before they go off, we get feedbacks from them. We have either interview or they will write, so from that we will be able to tell how successful we are in terms of, for example, education, how successful we are in educating them. Did they learn something on our exercise? So yes, we do.</p>	Evaluate
21	I	Just earlier you mentioned, your main goal in the zoo is conservation.	
	P	Yes.	
	I	Do you have any success stories in breeding or the conservation of animals?	
	P	Oh, yes.	
22	I	Can you tell me about that?	
	P	<p>Currently we are the only zoo, in Malaysia, that is doing the conservation release programme for the Milky Stork, and it started out in...way back in the eighties, because statistics in the year two zero zero six, there's only six individual of these birds in the wild.</p>	Purpose
23	I	Really?	
	P	Yes. And over the years we have managed close to about two hundred.	
24	I	That's brilliant.	

	P	So now we are actually working together with the Wildlife Department, doing release programme in two places, and one in Kuala Gula, then of course we get help from the bird watching groups. They actually see some chicks, meaning that if they can breed outside, it's a success story, because you talk about conservation, it's not just about breeding animals in the zoo, it must be about actually introduce them back into the wild.	
25	I	Back into the wild.	
	P	And that is very challenging, it's easier said than done, you know really you have to camp out with them, because captive animals they do not know their natural enemies, they just have a tendency to wait for the food instead of looking for...	
26	I	Going to look. So it's not an easy process, and I don't think my personal opinion is that a lot of zoos can say that they are actually playing a huge role in releasing animals back to the wild, so it is a challenge for us. But congratulations on that, I've heard about the Milky Stork, and they are endangered. It's because your education programmes are also focusing on that. I think it's great.	
	P	The only thing that we like to stress here is, that, yes no doubt there's a lot of other zoos doing release programme, for example San Diego Zoo, they managed to breed the wild horses [INDISTINCT], but that involved millions of dollars, whereas we, as an NGO in this part of the world, we do not have that amount of money, so the way we doing this is we work together with the universities and local government without really spending a big amount of money, but we still manage to have a conservation release programme.	
27	I	That's excellent.	
	P	To me, it's really a momentous occasion because without that much money, we still can do some release	

		programme. Actually we have two...a few other species that we are discussing with stakeholders outside the way to release those.	
28	I	Well, I have a lot of respect for what you are doing, and actually that's also why I chose to include you in my study, is because I think we are very similar, the national zoo in Pretoria and Zoo Negara, there's quite a...similarities I see. Tell me, what is your personal opinion about research using a zoo, and you think zoo animals?	
	P	Well, research they...you talk about there's two kind of research. One is of course the intrusive kind, intrusive kind mean you subject the animals to anaesthesia, you collect blood, you collect all kinds of thing just to get the basic of that but in our case, because we in this part of the world, we do not have the equipment, neither do we have the technical support to actually do really, really intrusive kind. Ours is more, the behavioural kind. Behavioural meaning we try to study how the animal behave in captivity, compared to in the wild, and then it's more on...how do you call it? What we do now is we're focusing a lot on enrichment like yesterday.	Purpose
29	I	Oh, yeah.	
	P	So, we trying to educate the public the importance of keeping the animal, as well as...not just keeping for them to see, but actually educating them what we doing in the zoo, we have to take care of the welfare of the animals, whether they happy or not.	
30	I	So you are involved in research projects like that. Tell me, how do you see Zoo Negara's role in education?	
	P	We have actually...we in the process of sitting down with the Ministry of Education so that part of the curriculum is exposing the children coming to the zoo, not only Zoo Negara, because we have other zoos	Strength

		around.	
31	I	Oh yes.	
	P	It's more like creating the zoo as a outdoor experience, outdoor classroom, because you still can teach children, for example, how to count in the zoo setting, how many elephant is there in the exhibit, you can even tell them the concept of colours, you can even tell them concept of big, small, long, short, hard, shell, things like that, the texture, the smell. So basically that is why, year to year, we do get more and more children coming in, because some of the private school are actually capitalising on what we want families —	Strength
32	I	That's good. So you work really closely with your education department?	
	P	Yes.	
	I	Do you, at the zoo, have a written education policy?	
	P	Recently...it's only recently that we have because whatever numbers I mentioned earlier, it's just very incidental, meaning over the years, when we look back last year, hundred and fifty thousand, year before that is about hundred thousand, I mean, there is an increase. Being a business as well, we even spoke to the education department, why don't we capitalise on this? Capitalise means, not to attract more student to make just money, but the same time to educate them. That is why now, the education department have come up with all kinds of packages, tailor made for any groups. For example, if the school call in, we will ask them what do you want us to do with the children? Because previously when I notice about three years ago, when there's a school group that comes to the zoo what the teacher does is, once they usher the children into the zoo, they say...they will just sit and let the children go of. But from the education point of view, so our education department will select if they see that the teacher will have no proper planning for them, so we	Output

		will take over.	
	I	Okay, good.	
	P	We'll bring the children, we want to make them know the function of the zoo, educate them and create conservation awareness as early as possible.	
33	I	That is just great. Do you have a strategic plan for education?	
	P	Oh yes, we have just put in the KPI for the education department. KPI meaning in Selangor, this state alone, we have roughly about a thousand plus primary schools, and one of our sponsor have actually sponsored a van which is a fourteen-seater van, so what we plan to do...or rather in the pipeline, is that the education department instead of waiting for children to come in, they will have to go out to the schools for outreach programme, which will be sponsored meaning we work together with our partner, for example, some the banks because all the major company outside they have money for the CSR programme. So we tap those money to bring out, and at the same time it is a income to the zoo, as well as we educate the children and create awareness, instead of just waiting for them to come in, we will go out as well, go out into the communities.	
	I	So it's outreach. Actually you answered my next question, which was what are your future plans for Environmental Education in zoos? So, do you want to add anything if I would ask you now?	
	P	Well, we have studied the curriculum of our primary schools. A lot of them talk about animals, a lot of them, how do we call it? Nature subject in the school, but not many of the student have the opportunity to go and experience those, and the zoo is only setting where you can sort of feel and actually see those animals. What I mean is, yes, there are forest out there but if you were to bring them out there the chances of them	Opportunity

		seeing tiger, for example, is very rare, and where the tiger will eat them up. But in the zoo setting at least they can see a control environment, an environment that mimic at least a natural setting, so they will...we can even educate them, they can see, they can smell, they can hear the tiger, how it moves and all.	
34	I	To your personal opinion, do you think zoos and aquariums still have place today?	
	P	Oh yes, definitely we are relevant in existing now. Why I say so is fifty or hundred years from now, I don't think that the...in Crech (sic) the forest is still there, so a lot of the animals will be displaced, so the only place that our children, our future can see animals is in the zoo. That is why we aspire to...we are working together with WAZA, creating...trying to improve further how we take care of the animals, because our challenge is also...now is the computer age, a lot of National Geographic, Animal Planet, so children when they come into the zoo, they will have that tendency to compare. How come your...so we have to be very careful there, so we have to continually improve, even though probably on our part, Zoo Negara, we are a bit slow, because when you want to change exhibit, it requires money, so money is what we do not really have in abundance, so we are doing very slowly. So now we are focusing on the five hundred animals because people said why not you increase the number of species, but then again, no, we focus—	Place
35	I	Focus on what you do.	
	P	What we have and improve further.	
36	I	Also, I sometimes...we have this thing about conserving biodiversity, and my personal opinion is also that the word biodiversity is too broad for people to understand. That you must rather make use of a specific animal, now we conserve the Malaysian Tiger, or the White Rhinoceros, and...that people can link to that easier. I think sometimes you talk about biodiversity, people don't really know what it is.	

	P	<p>Yesterday I had the opportunity to actually give a talk to this third year teachers, they will be teacher in future, so my subject of the talk was specifically conservation, they were interested in what we do on conservation, so I mentioned to them about four key words when you talk about conservation. Conservation per se, one, there's a lot of conservation, habitat conservation, biological conservation, and all that and then the second word, very important word, is biodiversity. What it means, basically, biodiversity is the whole eco system. It's not just tigers, it's not just frogs, because without the tigers, there will be probably no frogs, because...how should I say that? Everything is interrelated and then, of course, the two other words is in situ conservation and ex situ conservation. So I really stress on that then only then they saw that it is not as easy as it seems because you cannot be just focusing on one, that is why in Zoo Negara, we have our seven-in-one concept, seven-in-one means we have mammals, amphibians, reptiles, birds, plants, insect, because people focus on, for example, year of the gorilla, year of the tiger, only the tiger, but what is the track habitat loss? If it is habitat lost, even a small insect will suffer, that is why we putting everything in, so that they will know that, you...we have to take care for not just one.</p>	Strength
37	I	Thank you very much for this interview, I really appreciate your time.	
	P	No problem, no problem.	

UWEC 1 Interview – Education and Information Manager (M2)

Interviewer: I

Participant: P – Education and Information Manager

***Start of Interview**

Q			Coding
1		Professor Fulcer (sic), I would like to thank you for the time that you are giving me.	
	P	You are welcome.	
2	I	You are the education and information manager here at UWEC?	
	P	Yes, I am.	
3	I	First of all, can you tell me, do you have, what we call in our zoo, a strategic plan according to which you work?	
	P	Yes.	
4	I	You have something—	
	P	We have a five year strategic plan —	Input
5	I	Five year plan?	
	P	...that we actually concluded last year. We concluded in [INDISTINCT], we went out of here but what I can say is that it was actually a very consultative process that lead to this plan. We consulted with all the stakeholders, held various workshops with all our stakeholders that we work with, including schools, the ministry of education, pupils themselves, teachers, the board members, likeminded organizations and various other stakeholders. We held various workshops to be able to bring on board everyone as we	Strength

		planned for our work. So we have a strategic plan, yes, we do.	
6	I	That is great! And in that strategic plan, I gather that you have stipulated your outcomes you want to achieve, and on a longer term, on the five year basis perhaps, the impact you want to see in your community. Do you feel that you are achieving your outcomes?	
	P	Thank you. Actually we formulated the plan right from key result areas, and I'll speak specifically about my department. We have key result areas in my department that we would like to achieve and then, of course, under those key result areas we have outcomes and outputs over a period of time and I will say that we are achieving our outcomes, but not a hundred percent.	Outcomes
7	I	You do have problems?	
	P	Yes, we have some challenges.	
8	I	Challenges, yes.	
	P	We have some challenges, so...but I will say that given the challenges we have, and the outputs, or the outcomes we actually looking at the moment, we are doing well.	
9	I	You are doing well.	
	P	Because, a lot has changed in this institution in the way we do our work, in terms of Conservation Education and information dissemination, so we are doing well although we have not a hundred percent achieving our outcomes.	Outcomes
10	I	What would you say...would you mind sharing with me the difficulties you are experiencing.	
	P	Quite a number. But most importantly it is funding, we have a funding gap.	Threats/Outcomes
11	I	That also came out from your education officers.	

	P	Yes. We have a funding challenge. As you know that to be able to implement this plan, you need money, you need to go out for example, outreach programmes.	
12	I	You wanted to do a service to the community, and you need money for that.	
	P	Oh yes, we need money for that. This institution at the moment is not yet fully self-sustaining, and gets some meager funding from government, basically to contribute mainly to the capital development of the centre. So all the money for our operations, or the recurrent budget, at the moment is basically contributed by ourselves, generated locally by ourselves. Government has not yet put in place the institutional framework, or the legal framework to be able to fund us both for capital development and recurrent operational expenses. So we end up using only the money we collect through our innovative programmes towards a bit of sustainability. That is the only money we are able to use for our operational.	Threats
13	I	And it just goes back...the money goes back into your programmes.	
	P	Programmes. It goes back into our programmes.	Strength
14	I	So you don't actually have anything to build your centre as such, because there's nothing left?	
	P	Yeah. There's nothing left, we actually plow it back.	
15	I	Everything goes back?	
	P	We collect and then plow back. But of course we have some money that is in the trust fund, that we put in the trust fund, to be able to invest it and grows and make more money for the organization.	
16	I	That's great.	
	P	So, that is the key challenge, funding.	
17	I	funding, yeah.	

	P	A very key challenge. And then of course the others is the general environmental problems in the country, one of them being of course overpopulation in the country as Uganda. We have a high population and the higher population of course leads over-consumption, as you know, and that leads to a high rate of environmental degradation, so we end up having a lot of work to do in terms of educating the people about conservation of the environment and of course their problem is lack of knowledge about environmental conservation issues. These are contemporary issues that I am talking about that affect the general outlay of the population in Uganda, issues like poverty. When you are talking about Conservation Education, in those issues you're talking about sustainable management of the environment. Someone is poor and is preoccupied and is looking for income and livelihood for his family, he will not [INDISTINCT] to you. So in the long run, it creates a problem of poor attitude towards environmental conservation.	Threats Outcomes
18	I	Because if you don't have food, you're not going to care about not chopping off that tree to make a fire.	
	P	Yes, yes.	
19	I	Exactly.	
	P	So those are some of the challenges, that we go out there and it takes a lot of effort and time to be able to convince people to listen to you, to take your message and you must be able to do it in a very interactive way, so you have to use interactive materials, posters... You cannot just speak to the [INDISTINCT]	Threats
20	I	No, no.	
	P	You need –	
21	I	You need those educational –	
	P	...video or visual materials, films, you create more interest for people to pick your idea, listen to you,	Input

		otherwise they will not listen to you because of the other problems that I have mentioned that they do have.	
	I	Of course. So, you were talking here about the impact you want to achieve in your community, and you are going to work with that with your five year strategic plan.	
	P	Yes.	
22	I	So I would say for at this stage it's too early to see whether you are making a difference in your community or can you say that already you can see a difference in your community?	
	P	No, I can see it already. In that strategic plan, when we were beginning, when we lit up that plan, because we had it done last year, we finished the whole process last year.	Outcomes
23	I	Yes	
	P	At the beginning of last year. Before we did not have that plan, we were not reaching out to many communities. No we were not because the department was varied in terms of staffing, so the plan recommended that we expand the department, bring in more other people, which we did, and so we did some specialisation in the department, we created some departments like, school and community outreach programme department. That one is on the role every day, going to schools, going to communities, specifically Conservation Education. That's why I'm saying we have created a lot of impact through this strategy of upgrading this department with going out to do Conservation Education in different ways, for example exhibitions, we do exhibitions and we carry animals to these exhibitions and then use them like what you see us doing here, we use those animals in the communities, and that creates a lot of excitement, and a lot of [INDISTINCT].	
24	I	So you use that animal to bring your message across.	

	P	Oh yes. So, people...because they see one of the problems you have here is that we have a problem of poor attitude to domestic tourism, so people, because of their problems, I told you like poverty, people is working trying to find money to feed their families, they don't have time to relax, so they don't go to the national parks, much as we have them, they don't know these animals, they have not seen them. So once you take them out there, people are very interested, so they come, you pass on your message, people appreciate the interrelationship between animals and humans and environment. But you know our play, you know.	Output/Outcomes
25	I	Exactly.	
	P	So it is working, and it is very, very promising.	Outcomes
26	I	Well, I congratulate you on that.	
	P	Thank you, thank you.	
27	I	Although you are telling me now that you put a lot of emphasis on your outreach programme...you are welcome to answer. I can just stop here.	
	P	[ON CELLPHONE]	
28	P	We can continue. Not only the outreach programmes will strengthen the onsite programme, the onsite Conservation Education programmes, we've expanded them with –	Outcomes
	I	Because you are reaching a lot of children, a lot of kids come in here.	
29	P	Using a thematic guided tour approach because initially they will just come and walk through but now we are using a thematic guided tour approach, where the school comes in and they have a particular theme that they are following during their tour. What happens, the school books are there and they tell us what they are	Input/Activities

		interested in, then we develop —	
	I	A programme for that.	
30	P	And then we move them through the centre along that theme. So it's not only outreach programme that [INDISTINCT] put much emphasis on, all our programmes including research, [INDISTINCT] research here. But now we are going in the area of starting research through training our staff to be able to do a lot of research. Even basic research at the centre here, which is actually good for management purposes, so we are trying to strengthen all areas, but like I said we have some challenges of course with funding.	Output
	I	Well, as far as Conservation Education research is going, this project I think is also contribute you so I will be...I would actually like for us to do perhaps a joint article or something like that.	
31	P	Publication.	
	I	Publication.	
32	P	Very interesting.	
	I	I'll come back to you. This is actually, this study is now for a thesis...my PhD that I'm doing, but it will go broader than just that.	
	P	Great.	
	I	Do you have any numbers of how many children do you reach with your outreach programme and how many do you reach with your onsite programme?	
	P	Okay, I wanted to get you the figures.	
	I	Okay, that's fine.	
33	P	Okay, now for example, last year, last financial year two thousand nine two thousand ten, we reached...are	

		you interested in Ugandan adults, the children, the school groups, those various categories?	
	I	You can just give me the total.	
	P	The Ugandan, for example, school groups –	
	I	School groups, yes.	
34	P	...we reached, last year, we reached one hundred and ninety six thousand. If you want to write that down?	
	I	One hundred—	
35	P	One nine six—	
	I	Thousand. Was that with your outreach?	
36	P	That was on site.	
	I	On site.	
37	P	One nine six two one five.	
	I	That's a lot.	
38	P	One nine six two one five. Those are the ones we received here on site. On site David [sic] should have given you the figure.	
	I	Okay, I'll ask him.	
39	P	He needs to give you the figure. It's relatively a new programme.	
	I	Yeah, he started last year really.	
	P	Can you stop it a bit? [INDISTINCT]	
	[BR		

EA K IN AU DI O]		
I	The Conservation Education programme, is it worthwhile for UWEC in terms of cost?	
P	In terms of cost? Yes, it is worthwhile.	
I	In terms of what you put in, what you get out?	
P	Very much, very much worthwhile. In fact we are putting in very little.	Strenght
I	And what you get out is?	
P	Much, much more.	
I	You can see that?	
P	We need to actually put in a lot more. We need to put a lot more.	
I	Would you say that your programme, your Conservation Education programme, will it be sustainable in terms of the support it receives?	
P	Right now... It's a two way, maybe I can explain a bit?	
I	Yeah.	
P	It's a yes and no. Yes and no. [ON PHONE CALL]. What I'm saying —	
I	Let me just start here.	

	P	What I was saying is that we are doing our Conservation Education with a number of partners. For example we write projects, and sell them to partners who fund, so in that case the sustainability is difficult. For example the project we visited yesterday –	
	I	Yeah.	
	P	...we wrote it and was funded by [INDISTINCT] CNDP –	
	I	Yeah.	
	P	...and once the funding ended, that was it.	
	I	Yeah	
	P	So we are struggling to keep on the monitoring of the areas that we established and to see whether people are gaining value from it. That one is difficult.	Threat
	I	Yeah.	
	P	But for onsite programmes and outreach programmes, they are sustainable because, we are really using the money that we are actually collecting.	Strength
	I	You are plowing that back?	
	P	Yes, and that one is assured.	
	I	In terms of updating the information that you are getting from your programme, is it sustainable in that regard?	
	P	In terms of?	
	I	Updating of information?	
	P	Mmm.	

	I	So you take whatever you get from your communities and you change your programme according to that, so that it needs to change...if you see something doesn't work, then you change it accordingly?	
	P	I think we've not done very well there.	Strength
	I	The evaluation?	
	P	Evaluation? We have not done very well there, I must admit. We have not done very well there.	
	I	That is a problem all over.	
	P	We have not done very well there in terms of evaluation and I think I need to look at...to be realistic, we have not done well on evaluating our programmes.	Evaluation/outcomes
	I	And then to take the information...well, I suppose what we are doing here, will also help you with that regard.	
	P	To improve. And partly it's actually due to the other problem of funding because in the evaluation you know you need to look free, past, go back, come back, information.	
	I	And it also takes a lot of time.	
	P	Plus the cost. It has a lot of cost and time.	
	I	Time is money in the end.	
	P	So we have not done well there, that's the truth.	
	I	Talking about the exposure you are getting? Would you say that your programme is in line with your social responsibility requirements?	
	P	Corporate social responsibility? Yes, it is. It is in line because, in addition to being conservation and education, we also employ people from around the centre, we also buy food stuffs for the animals from	Threat

		around the centre. So we are meeting partly our social responsibility although maybe to not the highest level because we also have the problem of funding.	
	I	Exactly.	
	P	And you know it's in parks everywhere.	
	I	Would you say that your Conservation Education programme provide marketing possibilities?	
	P	More?	
	I	Marketing possibilities?	
	P	Yes it does, we have actually fully fled the marketing information [INDISTINCT] officer.	Marketing, Strength
	I	And your programme, does it improve the image of UWEC?	
	P	Very much, very much. Because, like I told you, we go out very far and people know about UWEC and the people...it does very much, in fact it is at the centre.	Strength
	I	And does your name UWEC...do you make sure that it is visible at workshops, at certificate ceremonies, at...whenever you do.	
	P	We do branding. We do.	Strenght
	I	Branding, the branding you call it.	
	P	We do brand and we have materials, banners, PVC banners, [INDISTINCT], wherever we are...we really try to plant our things there.	
	I	We talked a lot about funding now and the problems you have here with funding. If you would say to a company or an institution, why should they support your programme?	
	P	They should support our programme because, one, the problem we are tackling is real, yeah, are you	Outcomes

		getting me? The programme we are handling is real, it is a real problem in Uganda of overpopulation, overconsumption, high level environmental degradation —	
	I	Deforestation.	
	P	High level environmental degradation, deforestation, poor farming methods, overfishing, there is fish poisoning, degradation of the lakes.	
	I	Yeah and I see the lake –	
	P	[INDISTINCT].	
	I	...the way the lake is...the level of the lake is going down.	
	P	It's going down, it is [INDISTINCT].	
	I	That is climate change.	
	P	Climate change, which is real.	Outcomes
	I	It is.	
	P	So somebody should support us because the problem that we are tackling is real, there is a problem. We have the expertise to sort out this problem, to educate the people so that we can have sustainable way of living, we can have change of life and attitude towards the environmental conservation. We can have positive set of action by individuals. The project for [INDISTINCT] was volunteering system was for sustainability and we achieved a lot in terms of recruitment of youth volunteers, for example, to do volunteer work in terms of re-greening and waste management. There's a lot of waste disposal, uncontrolled poor waste disposal which we have seen, I think, [INDISTINCT]. So the problem we are having is real, we have the expertise to sort it out, as you have seen, and the funds actually can be used optimally.	Strength Impact/Outcomes

	I	Exactly.	
	P	And put to good use with tangible results.	
	I	And you have the forests here.	
	P	Very many forests.	
	I	Forests, that—	
	P	Very many national parks.	
	I	Forests and all the beautiful biodiversity you have here, all the species.	
	P	But the forests are being cut down.	Outcomes
	I	Being cut down.	
	P	They are being changed, the land is planning is poor. Poaching is going on in the national parks.	
	I	It will help the whole world if we can have more funding provided to your Conservation Education here where you can make a difference, where it is going to count.	Impact/outcomes
	P	Make a difference.	
	I	Sir, I really thank you for the time, I know you are very busy.	
	P	You are welcome. You are welcome.	

*End of interview

UWEC 2 Interview – Director (D2)

Interviewer: I

Participant: P – Director

***Start of Interview**

Q			Coding
1	I	Good Morning Doctor.	
	P	Good Morning.	
2	I	Thank you so much for the time you are giving me.	
	P	You are welcome.	
3	I	You have just told me that the main mandate of UWEC is conservation, education and not rehabilitation of animals.	Purpose/Outcomes
	P	We have basically have four mandates in order of importance, conservation, education of the Ugandan public, is number one, and the aims of that is to spearhead the conservation of our biodiversity. Which by many accounts is one of the highest in such a small country. So we thought that conservation in protected areas has to be heavily complimented by conservation outside those protected areas because according to the two thousand and two wildlife census, over fifty percent of the wildlife in terms of flora and fauna is actually outside the protected areas, so we need to protect that even more so than what is already protected areas, which are protected by law. So if you have fifty percent of your wildlife biodiversity outside the protected area –	Purpose
4	I	Parks, and yeah.	

	P	<p>...then educating and creating awareness within communities becomes very, very important because outside the protected areas you have all sorts of land ownership where people are having leases, people are having full ownership of land where they can do as they wish. So if those people are not properly educated and sensitised on the need to conserve what they have on their land, you can have a lot of loss of this biodiversity. So that is our...number two, we rescue and rehabilitate to complement our earlier role because we want to create an avenue for animals or wildlife, which is either injured –</p>	Outcomes/Purpose
5	I	Yes?	
	P	<p>...or confiscated at ports of entry through actions of illegal trade or other criminal activities. Animals which are actually trapped within community areas, such that those animals can be removed from the immediate public but used on a larger platform within our facilities as a tool for education. Whatever we rescue and rehabilitate, we teach on return to the wild but we also teach when we keep them here because then they become the subject of an exhibition, the exhibition having the aim of creating awareness within communities. Thirdly we do conservation breeding, and this is mainly for endangered and threatened species as per the requirements of the wildlife managers, but lastly we also do what we call edutainment. Edutainment means educating while entertaining, so this is an entertaining centre, kind of a resort but it has an educational focus. As well we run programmes of education within here, we run programmes of internship, we run programmes such as keeper for a day for the general public and all those interactive programmes aimed at creating awareness within the community about the value the wildlife biodiversity.</p>	Outcomes/Purpose
6	I	Doctor, according to you, do you feel that the impact you are making in the community, are you achieving that? At this stage?	

	P	<p>Yes, we are, I'll give you an example. Within the Entebbe Peninsula we have lots of marshlands, and one of the signature animals that you find in the Entebbe Marshland is the sitatunga. Sitatunga is an antelope which lives in the marshlands and this is an animal which has had a lot of pressure from communities as they expanded their habitation and we started a community programme, reaching mainly to the younger generation, teaching them about the importance of not only conserving the sitatunga but its environment as well. So that programme yielded in a way that the young generation, to whom the parents strive to provide food and school and clothing, stopped eating the hunted sitatungas. So parents when they brought down meat, to feed the family, the family opted for vegetables because they had been told aware that you need to conserve these animals. So the parents had to stop hunting and tried to find out who has changed the mind of their young families.</p>	Strenghts
7	I	Yes.	
	P	<p>To stop...because meat here is a delicacy, for a child to refuse meat, the parents usually wanted to know who has been talking to their children and what is the message? So right now we have a restored population of sitatungas. But that also goes for animals that we have done, like in [INDISTINCT] forests and in Hoima where we used to rescue on average ten chimpanzees a year. It's now been two years without rescuing a single one, and these two years coincide with the community sensitisation programmes which we started in those areas. So we've had quite a lot of success. Our hotline for rescued animals goes off quite often. In the past it never used to, because the people used to kill the animals that they found, in their communities. Right now, they call us and even give us advice sometimes of relocating these animals within the communities. In the past it used to be, this animal is in my community, can you take it away to Entebbe?</p>	Outcomes

		Now it is, this animal is in my community, can you take it to the forest near me? Because people now understanding that...	
8	I	The natural habitat.	
	P	They have to keep the habitat, they have done that, but they want the animals in their communities because they're realising at some point these animals could be a source of income for them through [INDISTINCT] activities like ecotourism, like tourism of...ecotourism mainly. So this change in the attitude is evidence that our community programmes are running, we are doing re-greening along the peninsula, in nine divisions, nine communities, and already many of the schools which you may have visited, the re-greening was done by UWEC.	Outcomes
9	I	Yeah, I've noticed those trees.	
	P	The trees and stuff like that. So, yes, I think our work is [CROSSTALK]	
10	I	Your impact is achieved. Well, I think that is...part of my study is why I am here, to see what you are doing and why it is so successful because you are really setting an example for the rest of Africa, and I really congratulate you.	
	P	Thank you, thank you.	
11	I	Tell me, your future plans for Conservation Education at UWEC?	
	P	Probably not only at UWEC, we have lots of things that we want to do at UWEC. We want our education programmes to be more interactive, especially for the young ages, because we realise that the attention span for the attention span is very short and therefore they need interactive things and exercise more than a typical classroom setting and we are doing that within our centre to see that we provide interactive education	Opportunities/Future plans

		<p>or things for children to know, to measure themselves against chimpanzees, to understand how a chimpanzee lives, to understand how these live, how they can live with these animals, how they can respect wildlife and things, those are some of the things we try doing here but, on a wider scale, we feel that right now we are so concentrated here in the central region, we need to reach out to other areas of Uganda and therefore we are planning to put satellite centres within the four corners of Uganda and these satellite centres will be running programmes on biodiversity that is local to that particular area –</p>	
12	I	Yes. Okay.	
	P	<p>...and rescues coming out of that area will be kept within that area to create awareness within that particular region, so that is one of our plans in the next five years. We have been incorporating our programmes within the school curriculum. We have fully integrated that at primary level. We are hoping to have integrated the secondary level by the end of this year and we are working now on tertiary levels because tertiary levels are rather divided into vocational and academic, so we looking into ways that we can incorporate mainly through internships and things like that. So that is another thing which we are doing to expand our programmes. We are also creating capacities in recording successes and challenges that are faced not only by ourselves but across the conservation, because those records, the history, becomes important for future generations to look through, so we are also developing those capacities. And also creating the collaborations with other African institutions because, despite the fact that we are having differences in our local situations, but there's some principles which are generic across and we feel that if we talk to South Africa, if we talk to Kenya, we talk to Tanzania, now we have formed the East African community. So we are looking at establish harmonised programmes across the East African region, which will run between Uganda, Kenya,</p>	Input Strength

		Tanzania, Rwanda, Burundi and Kenya, Tanzania, Uganda, [INDISTINCT], that's five countries. So we are now trying to do a harmonisation of our...not only tourism but also our conservation.	
13	I	Efforts.	
	P	So we can do trans-boundary conservation programmes for the chimpanzees or the gorillas, it's across Bwindi, Gahinga, Virunga, in DRC and then going down to Virunga in Rwanda. So these are the things which we are working on to expand our programmes here at UWEC, so that we can create impact within the society. But our main aim still remains the young generations.	
14	I	That's your focus?	
	P	Because they change attitudes –	Impact
15	I	There you can change the attitudes.	
	P	...within the older people.	
16	I	Also then they can take it back to their parents as you said before now.	
	P	Exactly.	
17	I	I congratulate you again and good luck with all your plans for the future.	
	P	Thank you.	
18	I	Thank you doctor.	

Interviews with other key individuals in the zoo environment

- Chief Executive Officer of the Johannesburg Zoo (D4)
- Managing Director of Two Oceans Aquarium (D5)
- The Executive Director of PAAZAB (D6)
- The previous Managing Director of the NZG (D7)

Interview: Managing Director of Two Oceans Aquarium (D5)

I	Good morning X	
P	Good morning Elize.	
I	Thank you so much for making time for my interview and for being part of this study, I really appreciate it. Please tell me what is your position at Two Oceans?	
P	My position is Managing Director	
I	Can you please tell me what you...what do you perceive as the change?	
O	I apologise.	
P	We can just pause.	
I	Is this for me?	
O	Yes	
P	[INDISTINCT]. Elize, are you having something?	

<p>I Just the water is for me.</p> <p>P Oh thanks a lot.</p> <p>I That's going to be nice. Now we have to start again.</p> <p>P Start again.</p> <p>I Can you please tell me what do you see as the vision that you have for Two Oceans? And if I say vision what I with that is a long term impact in the communities, change that you want to see in the communities?</p> <p>P Well we obviously what we want to change not only attitudes but behaviours, so if one looks at our vision statement that the Two Oceans fosters: love, respect and understanding of our oceans to inspire support for their future well being. That's a very generic vision statement and I would think that we do very well with fostering love and care for the environment but I think that it needs to go just that step further in bridging the gap that's opened between the young people of today who quite often don't see that they are an integral part of the environment. They somehow separate themselves. In the city you, don't have to worry about the environment, you're not part of the environment so very much part of what we wanting to do is to bridge that gap to, make youngest understand and any visitors understand that they are part of the global environment and whatever they do affects the environment and vice versa.</p> <p>I So if you can perhaps be more clear about the shorter term outcomes you want. What changes in behaviour is it that you want to see? What are those changes?</p> <p>P Well I think that what we want to do, we want to see people leave the aquarium saying oh my goodness, I understand, I understand that I am a part of all these processes and I need to change so...and I need to change not only my thinking but my behaviour. I need to go home and do things differently to what I'm doing now that would be my ultimate. purpose</p>	<p>Purpose</p>
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<p>I Do you think it is possible at all to change to people's behaviour?</p> <p>P Absolutely, I have no doubt. I think that behaviour is a choice. When you have a choice you can change that choice, ja. purpose</p>	Purpose
<p>I Good. Where are you currently situated as far as achieving these outcomes?</p> <p>P We don't know, to be honest. I think that we...all of us in aquariums and zoos would like to believe that we're changing people's attitudes and behaviour but actually even though there are lots of studies on that aspect of what we're doing there's not too much evidence that we're actually doing it so I can't answer it. All we do is live in hope that what we do is making a difference. Purpose</p>	Purpose
<p>I That is so, I agree with you. We all...otherwise why would we be doing this job in any case? So do you evaluate the impact of or the education efforts here at the aquarium?</p>	
<p>P Yes we do. We do a lot of surveying. We do a lot of research. I think that in the early days, we didn't do any research at all and we were just...we were cruising in the dark. That's changed radically over the last several years and we now have far better handle on how we are doing in terms of responses of scholars, students and visitors. So we've got a handle. I'm not saying that it's the best. I think that quite often I look at the responses and I think I wonder why you're giving us this response? Is this because you've been given a piece of paper and you have to respond and if you're going to respond to us –</p>	
<p>I You want –</p>	
<p>P ...it's going to be positive?</p>	
<p>I Yes you want to give the right answer –</p>	
<p>P Exactly, the right answer.</p>	
<p>I [INDISTINCT] a smiley face.</p>	

<p>P So we suspect that quite a bit of it might be the right answer but, on the whole, if we have a look at the answers that we're getting they're actually extremely good. They're so positive that we feel that we're actually on the right track.</p>	
<p>I That is excellent. How do you see Two Oceans role in Conservation Education?</p>	
<p>P When you say Conservation Education, is that Environmental Education or is that strictly Conservation Education?</p>	
<p>I We use a term...there's a WAZA definition and we say Conservation Education is educating people about wild animals and wild places, that is our focus at...I suppose what you do here is more Environmental Education. All fall under the umbrella term sustainable...education is sustainability so we can rather call it Environmental Education for your purpose then.</p>	
<p>P I think in terms of environment but the question was –</p>	
<p>I It's your role. How do you see –</p>	
<p>P How do you see the role?</p>	
<p>I Ja.</p>	
<p>P I think this might...you may ask this question in a different way later but I think that basically I see zoos and aquariums as interfaces between the public and science, so our role in conservation –</p>	Purpose
<p>I Conservation.</p>	
<p>P ...in conservation is actually educating people as to what's going on in the natural world as seen by our scientists. So the role of the Two Oceans Aquarium is actually trying to get that link to everybody that we come into contact with. Purpose</p>	Purpose
<p>I Will you also say science advancement platform?</p>	

<p>P Yes, I think one part of our education thrust is actually to promote science within the younger generations. I think but that is coming...we're a very flexible organisation and when we get the message from government or from the Education Department...Western Cape Education Department saying guys we need more scientists, we hear that, that sort of message, and we redirect some emphasis into that area and we've done that. We're actually now looking at youngsters in terms of potential, generating potential scientists.</p> <p>Purpose</p> <p>I I'm thinking now about your junior biologists programme.</p> <p>P That's exactly [CROSSTALK].</p> <p>I [CROSSTALK]. Will you have a longer period of time that you actually spend with these learners and I think it's similar to what we have at the zoo club now where I can work five years and you can actually really see change in behaviour in these children.</p> <p>P Yes, we're hoping that we can obviously...one of the ways of determining how well you're doing in that respect is to track people and we're starting to track people through university and so on, so I think that that in the long term will actually show us what sort of effect we've had within that area.</p> <p>I Ja. I'm having problems with that tracking. I think we all have because what we have at the zoo is I have these kids at the zoo club up until grade eleven. Then in grade twelve they kind of disappear because they are focusing on their studies and then where do they go? So it is difficult for me to keep track but it is actually...I'm still working on a system that –</p> <p>P I suppose what we've done...I suppose we...I believe that we have a system here where the young biologist becomes an integral part of the aquarium, part of the young biologist course is giving presentations in the aquarium and then they become volunteers of the aquarium and then we track from there on so the ones who are going to make something of what they've learnt at the aquarium will then tend to stay with us and they will still be with us when they get into university and we'll track them through university. So I think there's</p>	<p>Purpose</p>
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something there where we can actually obtain some really good information.

I Tell me, do you have a education policy –

P No

I [INDISTINCT] aquarium?

P No.

I Something written...a written policy document?

P No, that's just two letters. No. I may get shot down in flames, there may be a case unbeknown to me that my head of education has an education a policy –

I I'll ask him.

P I think it should be asked.

I I will ask him.

P In my view I don't think so. I think that in many areas in the aquarium we do not have any policies and we're working hard and fast at that, closing all that gaps to actually have policies,

I Or a strategic plan then? The same thing.

P No, no

I Do you have a strategic plan?

P Not, oh definitely.

I So it's not the same.

P No the two are very different, in my view. [CROSSTALK] –

<p>I [CROSSTALK] –</p> <p>P ...policy, this is what we will do and –</p> <p>I And this is our vision –</p> <p>P Ja –</p> <p>I ...and –</p> <p>P ...but then that [INDISTINCT] off. That will stay. That's almost like your vision that you set it. You've set your policy and that's what we do. Now in terms of the –</p> <p>I Strategic plan.</p> <p>P ...strategic plan, that happens with us. Obviously we do it every year but it follows...the strategic plan may be a five year plan, ten year plan and that maintains from year to year depending on what's happening so in my view the strategy is actually quite different to the policy.</p> <p>I Yes, okay so that you do have? You do have specific education and strategic plan?</p> <p>P Absolutely.</p> <p>I According to you, we said earlier now do you know that you achieve your outputs, your outcomes, your impacts and you said to me you don't know because –</p> <p>P We don't know.</p> <p>I ...but what do you think? If it's just your own opinion? Do you think that you do achieve all that you're opting out there?</p> <p>P I think so. I think if one...obviously, you looking...you need separate out the general visitor and the school visitor who comes just in for a visit to the aquarium to those people that we get through our discovery centres. I think that in the discovery centres we got a far better handle on it and we can see a difference in the</p>	
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attitudes of those youngsters that come through, so in that sense it's good. They then go home, we get good responses from their parents. We're starting to...that net is starting to expand. So in that area I think that we probably doing quite a good job but quite good, it's all relative. We don't really know. It's absolutely subjective, there's no objectivity about it.

I But you feel positive?

P Very positive, ja, very. Otherwise if I wasn't feeling positive about it I would just probably have left this organisation and gone and buried my head in the sand somewhere.

I What are your future plans for Environmental Education, specifically for schools...school learners?

P There are a couple of plans. Obviously we've got to the stage now where we believe that we have sort of like a...if you...I may call it a critical mass in terms of the personnel, the staff that we have to run our facility. I don't see us expanding any further on the staffing that we have so now what we will look at in the years to come is the effectiveness of our programmes and the training of the staff, the effectiveness of the programmes and reaching more children.

I Reaching more?

P Absolutely. It's our intention to expand on this aquarium and, during that expansion, we will expand the education department and what we're looking at is moving from roughly fifty thousand children a year coming through to seventy plus.

I Is the fifty thousand formal [CROSSTALK] –

P No but it's about ninety percent so it's quite high. You could say about forty, forty-five come through the classrooms. We're trying to push that up and we're trying to actually pull all of them through the classrooms, we don't want these ones. These ones sneak past us every now and again, just get into the galleries. We want to take those and [CROSSTALK].

I Ja, so your aim is, if I can just put this perhaps is that you would like each and every learner to pass through this aquarium to get some kind of interaction with education officers?

P Absolutely

I Is that what you want?

P That's fundamental

I And if you would say...and you said ninety percent so you would estimate that ninety percent of the learners do get that –

P Yes.

I ...some interaction?

P Ja.

I Formal or informal?

P Where's the line with formal and informal? I think that is considered formal?

I Ja.

P I think that it's curriculum based so it's formal education, ja.

I It's formal so as soon as you have some education officer interacting it will be formal?

P And then there was another aspect that I left off at and that's obviously our outreach.

I The outreach, ja.

P Ja, and outreach to us is critical to get out to those people who never come to the aquarium so, again, we won't expand on that but we want to get it to the place where it's the most functional it can be. In other words we can't get to any more. If we got to any more learners our teachers would start falling over, that sort of thing.

So its maximizing that potential and it's got huge potential.

I That's great

P You haven't seen our van?

I No, I haven't.

P It's great

I I actually said to Russell [sic] I will come back for a week because I would like to go out together with the education officers and to follow them and really observe because part of my study is also observation which I don't have time for now but I would love to come back because that will be for me –

P And those guys are doing well and they're in Khayelitsha, they're all over the place and they're taking [INDISTINCT] stuff to people living in the wetlands.

I You see and for me that is the whole purpose of my study is to learn from other institutions in order to improve my own institution, what we are doing there, kind of action research if you can call it that so that observation part for me is actually the most crucial. So I will definitely make some plan to come and follow you around, see what you do because we don't a lot in our aquarium. We have marine month and that is basically it.

P Yes but you're primarily a zoo so –

I Yes we are.

P ...you do a huge amount in the zoo.

I But just remember those children that we do get there, most of them that is the first time or the only place they will ever see a shark and we do have two sharks.

P Ja.

I We also have seals and penguins, [INDISTINCT] very good. [INDISTINCT]. Are you in any way

<p>involved in the conservation of animals at this aquarium?</p> <p>P Ja, there are a couple of areas in which we're involved. I think if we have a look at...probably the three that come to mind immediately would be sharks, penguins and frogs.</p> <p>I Okay.</p> <p>P Those are probably our leading lines.</p> <p>I Do you have breeding programs?</p> <p>P We've got breeding programs for penguins. In fact we're one of the few places...in fact, we may be the only aquarium, certainly in South Africa but elsewhere, where...this is an interesting [INDISTINCT], we're probably the only aquarium that is releasing penguins back into the community. Purpose</p> <p>I We are breeding but we are not releasing at this stage.</p> <p>P Most people don't and then when they do they sell them to other facilities. We're not doing that, we're actually saying –</p> <p>I You're releasing back into the ocean?</p> <p>P ...we're releasing it back into the ocean because they're in dire straits so we're doing...and we're doing...we're not only breeding, we've become very involved with the NGOs and what have you who are...and scientists who are involved with penguin research and we're supporting them wherever we can.</p> <p>I Oh that's exciting.</p> <p>P Like raising money to build houses...breeding houses and all of that stuff, ja. So there's a lot of interaction there. In terms of the frogs, obviously we thinking with the whole WAZA thrust in that area and there we have a little money spinner in the terms of a wishing well. We have a dedicated exhibit on the whole frog problem and in there, there's a wishing well that makes a fortune and that money goes into frog research.</p>	<p>Purpose</p>
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<p>I Wow, so it works?</p> <p>P It works.</p> <p>I Okay good.</p> <p>P It works. And then the third one has been sharks –</p> <p>I The sharks, ja.</p> <p>P ...and there we've actually linked in with the scientists. We were the first aquarium anywhere to put satellite tags on – Purpose</p> <p>I On sharks.</p> <p>P ...sharks.</p> <p>I That's exciting</p> <p>P And the scientific community looked at us as though we were absolutely mad and started...when we approached them, we were told immediately you're wasting your time. Tell us, what is your end number? Typical scientist, what is your end number going to be at the end of the day? My response to that was I don't care. I'm doing it from primarily a publicity perspective to get awareness but also I know that those tags are going to give you information that you will never get any other way. They pooh-poohed it. Within five...four returns, satellite tag returns, they were knocking down our door for more tags.</p> <p>I Wow .</p> <p>P Ja, and in fact if they could get a whole lot more tags...they're just so damn expensive. If we could get more tags we would be putting tags on sharks all over the place and so now...so that's changed and now there's scientific paper on it, on the satellite tagging [CROSSTALK] –</p> <p>I [CROSSTALK]</p>	<p>Purpose</p>
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<p>P ...sharks on our coast.</p> <p>I That is brilliant</p> <p>P From something that a scientist said pooh-pooh what's your end number? Now they've forgotten about the ends because there's so much information coming out that they would never have dreamed of getting.</p> <p>I So according to WAZA, the main purpose of a zoo is conservation. Would you say that is also true for your aquarium?</p> <p>P I don't know if it's conservation –</p> <p>I Or education.</p> <p>P ...or education. Our primary thrust is education. We're doing...we're dabbling in conservation. We're doing a little bit here, a little bit there, we're involved but it's not our primary thrust. Our primary thrust is education. Function</p> <p>I But you actually already explained that, was my next question is are you involved in research project?</p> <p>P Yes.</p> <p>I But you already explained.</p> <p>P But also strictly, yes, we're involved in research projects but at a distance. The one research project that we're fully involved in is parasitology of fish.</p> <p>I Okay, of fish?</p> <p>P Ja, and we've got our own scientist here.</p> <p>I Wow.</p> <p>P That is one of the most beautiful stories in this whole aquarium is that scientist because that scientist</p>	<p>Function</p>
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has got no degree, he's got an Honors Cum Laude, he's got a Masters Cum Laude and he's doing his PHD now and that's someone...and there's another institute around who turned their backs on him and he was leaving for Scotland when we picked him up and said...because he was originally working there. He went somewhere else and he was on his way to Scotland we said no, South Africa needs you.

I That's investing in people and –

P Big time and we've supported him and he's just flown.

I Wow.

P Now he's doing work with the top parasitologists in the States, in Europe and in Australia who all tried to kill him. With a whole of the stuff that he came out with they are now very happy to be working with him, thank you very much. They consider him as one of the top guys.

I That is absolutely amazing.

P It's a hell of a story and this guy came from nothing.

I Just shows you.

P It does. So we're doing something here.

I Do you have an animal collection plan?

P Definitely. We didn't that long ago but I think we are slowly...one of your other questions are we accredited and I'll say no to that. The whole idea, we take a different approach. We've got an animal collection plan because what we want to do in this aquarium is approach it in the sense of getting all our procedures and things in line and operating before we go for accreditation. We're not putting our hands up and saying we want accreditation, what do we have to do to get it? We want to be there and then say come and look at it and see if we pass or not. It's a totally different approach. It's actually working it whereas it's very easy to get your accreditation, do all the paperwork, stack it up in files, I know it happens, and leave it there until the next

accreditation. Then here we've got another lot of people, pull it all out, update all the files, so we've got a different approach

I I'm going to...this question, I'm going to put it together. I want you to say...to tell me your personal opinion. Do you think that zoos and aquariums have a place in research, conservation, education and recreation? Where do you think the emphasis is? And I'm combining it also with my last question do you think that in today's society that there is still a place for a zoo and aquariums? Is it worthwhile keeping animals in captivity?

P I have no doubt that it's worth keeping zoos and aquariums. We'll go around and around and around this big discussion about whether we should be holding animals in captivity. The rate the human race is going at the moment, they may be the only animals left one of these days. It's getting really serious now and I think...but, jokes aside, if aquariums and zoos are those interfaces with the public, pull them out. Where does the public go? Where do they go to see things, to do things, to interact with nature? Very few, very little scope and then, unfortunately, we tend to be very Eurocentric or western centric people and think of everybody in terms of our beliefs, what we believe we should be doing to animals. There are a whole lot of people out there who have totally different views and, if we didn't have zoos and aquariums, their children and children's children would never have the opportunity of interacting with animals and if you don't interact with them you're not going to care for them, you're not going to love them, you're not going anywhere.

I Latest research has shown, and it's actually that interaction of the animals that will promote that change in behaviour on a longer term.

P Yes.

I Ja, so it's that wow factor that we speak about so I think that's what we have to aspire to because there's a debate going on saying research, we do not need a zoo to do that because we can have animals in the wild or we don't have zoos to have breeding programmes, you can do that on any piece of land, but for education and also the recreation part of it that wow factor, I think, is for us –

<p>P I think from an education and the...what? The education and the –</p> <p>I [CROSSTALK]</p> <p>P ...entertainment –</p> <p>I Recreation.</p> <p>Precreation, ja, very much so. Again, you can debate the whole research issue but there are always limits. There is limits to what people can do in the wild and quite Purpose often zoos and aquariums can actually fill those gaps. We've filled it often. We've often had people...students from UCT doing studies in the aquarium because they cannot to it in the wild, it's impossible, but it's that type of study, it has to be done. If you can't do it in the wild, where else are you going to do it? Do it in the aquarium. So I think that even though there's...yes, I can understand that, in many instances, its more worthwhile to do the research in the wild but, hell, there's a whole lot of stuff that can be done in the zoos that you can't do in the wild and I think that's where zoos and aquariums need to focus, they need to actually focus where can we actually slot into this to really make the biggest difference in those fields and it's there, it's waiting. I don't know if I answered your questions?</p> <p>I You did thank you so much. Do you want to add anything?</p>	<p>Purpose</p>
<p>P No, I think we could go on for days on this. To go on with whether there's a place for aquarium and zoos, I think that the world's a frightening place today and they are...I think they are becoming more important in terms of getting people to relate to where they are in the world and to reconnect with the nature side of things. I think that we're losing nature. I think it's very easy to lose nature, especially in cities and most of us live in cities, like nature's out there somewhere. Actually, it's not and so we've got a fundamental task to actually bridge that.</p> <p>Purpose</p>	<p>Purpose</p>

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Interview: The Previous Managing Director of the NZG (D7)

I X thank you so much for giving your time for this interview.

[VERNACULAR]

I So you just said that you were first at Jo'burg zoo and then at [CROSSTALK].

P My life in a zoo started in nineteen seventy one when I was appointed Zoologist at the Johannesburg Zoo and in nineteen seventy six I was appointed as Director of the zoo.

I Jo'burg zoo?

P Johannesburg Zoo, until nineteen eighty five when I then moved to the National Zoo and stayed there until two thousand and six. So it's about forty one, forty two years in the zoo world but about twenty one years at the National Zoo.

I And tell me where are you based now and what is your position?

P Now I'm based in the United Arab Emirates, in Abu Dhabi, Emirates and I'm the Manager of the President Khalifa's Private Department of Nature Conservation. Our main station is in Al Ain which is a small little town about one and a half hours from either Dubai or Abu Dhabi.

I And how do you think...according to you how does the zoos in South Africa compare to those in the Emirates?

P There's actually only one good zoo in the United...well one public zoo in the United Arab Emirates which is the Al Ain Zoo and the Al Ain Zoo is a good zoo. It's an old zoo. They started a redevelopment programme about ten years ago and it's been like a stop-start situation but they very anxious to really develop this into a great place. There are...the Dubai Zoo is a very bad zoo. In fact, Dubai Zoo is a member of the World Association WAZA and I remember at the time when I was President of WAZA, we were very close on actually terminating their membership, so the Dubai Zoo is a bad zoo. There's been talk about redoing the Dubai Zoo for many years but nothing is on the cards yet. There are a number of private collections in the United Arab Emirates, one of which is the Al Bustan Zoological Centre. It's a private zoo as well. It's not open to the public. Fantastic collection. In fact, they have...their second pair of okapis will be arriving in two or three weeks from now. They have four giant eland, Indian rhinos. It's a great collection but it's a private zoo, so the type of functions that you would expect in a zoo is not relevant in a private collection. You don't have education programmes for private collection. You don't have hospitality services but there are a number of very good private collections but in terms of public collections, the Al Ain Zoo is a very good place and it compares favourably to zoos in general. In zoos in general all over the world you have a few, percentage wise, good zoos in the world, considering the fact that there are probably in excess of five to ten thousand zoos worldwide. Of that, one would probably quantify to say that five percent are good zoos and, even in Africa, you have the same situation. There are terribly bad zoos in Africa. There are even bad zoos in South Africa. In fact, that is the reason why we started the PAAZAB Organisation in nineteen eighty nine to try and consolidate the zoos in Africa PAAZAB and also to try and improve the zoos but it's a long process and it's a very expensive process and you must always relate the quality of the zoo with the quality of standard of living in that country. You can't expect to

PAAZAB

have a good zoo in a country which is stricken with poverty. They will not allow the zoo to be a great and excellent zoo. So, it's very difficult to compare zoos but again coming to your question and giving you a rather long answer to that, Al Ain Zoo compares very favourably with the good zoos that we have in South Africa.

I What will the purpose of that animal collection or zoo then in that you are working at now or the other private zoos, what are the purposes of that?

P The private collections is probably an age old cultural tradition with the Arab people who, since time immemorial associated themselves with live animals in one way or the other and for different reasons, not only for their livelihood but also as a sport. Falconry is a very common practice. But they generally enjoy to have a collection of animals, the Sheikhs particularly so...but if you...the President's collection, where I'm working now, is probably the largest private collection in the world. It's an extraordinary collection and sometimes you wonder what is the purpose of that because it's only for him and he's only enjoying it and maybe a few of his friends. So, I think that the people...many of the people are sincerely interested in their wildlife. The problem is, they often do not know how to properly manage it and you'll be surprised how many South Africans are there working at the various private collections, which is a good thing, but I have never understood properly the reason why people would go to that extent, which is a very expensive hobby, you can imagine. You can imagine the expenditure of running a zoo where there's no income. There is absolutely no income. They don't sell the animals. They don't have any source of generating funds so they do it out of their own interest and it's also on a competitive edge. They like to compete with one another on what they have so I would assume that when we deal with the private collection that probably would be the basic reason. But Al Ain Zoo fulfills all important functions in terms of a

good zoo. They have a very good education programme, not so heavy on research but a good conservation programme as well.

I What do you think is the main purpose of the zoo?

P Zoos have always sold themselves through the pillars of research, recreation, conservation and education. They've justified their existence in that and you probably would be okay to say that that should be the function of a zoo but I don't think that that is what zoos necessarily perform. Let education stand on itself. This is a very, very important tool. Let's face it, educational opportunities is really fantastic and you can go to the nth degree in justifying that. More than seven hundred million people visit zoos around the world every year. For many people, that is the only opportunity they will have access to a wild animal. You can't ignore that. It's a fact. Even in South Africa with all the wonderful nature reserves that we have around the country. To many people, those places are not available. They are inaccessible because of the cost involved and the only time that they could really see a wild animal would be in a zoo. So, that is a draw card but the question is what do you do with that person now and what value do they get out of their visit? And that's a great responsibility on the Education Department to be able to let that person leave the facility with a better knowledge of its Purpose environment, not only of the animal, its environment, but we talk about environments. So the educational function is a critically important aspect for a zoo. The conservation issue can be debated. I know that there are many instances where we Purpose already have more animals in an ex situ environment in a zoo than in the wild. Siberian Tiger is...many examples are available. There are in fact many animals that today occur only in zoos. There are some flagship species where zoos have been Purpose instrumental in breeding them successfully

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Purpose

<p>and re-introducing them back in the wild, so those conservation principles are there. But I'm not so sure whether we really, in zoos, perform to the nth degree our opportunities in terms of conservation. Ultimately, conservation also...there's really no point. Let's face it, just to accept the Purpose fact that you save the animal in the zoo but the environment is being destroyed. It's really...it's like eating an ice-cream without sugar in it. The animal in the zoo should be an ambassador so if zoos are sincere in their conservation principles, they have to extend an arm to the environment as well. I'm not saying that they have to take over the National Parks Authority's responsibility but nothing prevents them from identifying projects especially in countries where national park services do not exist and then to perform some sort of conservation role in those countries and that is when I see the conservation role of the zoo really coming to function. So I believe that zoos Purpose should be very careful to say conservation is one of the principles because look, we saving animals, we breeding animals. It's much more than that. The research part of it...in fact when the National Zoo, in two thousand and four, changed over from The Department of Culture, Art and Science Technology and they disabled the function as a statutory organisation, then we had to go to the National Research Foundation, Gunther [sic]...Professor...Doctor Groenewald [sic] and I undertook a...I've been to many zoos previously but I've never concentrated on the research part of it. I didn't at all thought it was necessary and so we did a whistle stop tour in three weeks, two, three weeks we went to sixteen, from Europe to America, England, of zoos who identified themselves also as research orientated zoos and I was really shocked that of all the zoos that we visited, probably only two or three could really Purpose claim to be part of research. And the national zoo is doing a fantastic job now by virtue of their responsibility as a research institute now but previously, and in fact still to this day, very few zoos perform research so that pillar to say you justify yourself by research really is insignificant to the majority of zoos. And the</p>	<p>Purpose</p> <p>Purpose</p> <p>Purpose</p> <p>Purpose</p>
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last thing of course is recreation. Now this is perhaps the most important issue that people will tell you that that's the place you want to go to and it's not only what most people say it's a place where you take your grandchildren because statistics show that more adults visit the zoo than children because they more mobile. I'm not including school visitors that are going there as part of a curriculum, I'm talking about the guy that comes to the zoo to pay his entrance fee. So that is more popular with adults than with children. So zoos Place fulfill a very important recreational level so, I don't...I've read many stories, I've seen many stories, what would the world be without a zoo? It will never happen and I think it will become increasingly important but zoos continuously...and they are doing it. When I joined the zoo world in nineteen seventy, it was completely different to what it is today. The values that we put on Environmental Education, on environmental enrichment, on creating habitats, creating an environment that simulates the natural, it's fantastic and it's happening all over the world and the extent at which these people pay towards...and I heard a very interesting remark the other day when somebody says, what happens if zoos no longer exist. They said you'll have the world's largest collection of artificial rock because it's basically what happens. You create environments and that is important because, I've always said, the lion remains a lion, remains a lion, depends on how you display it and people are no longer interested. Fifty years ago you could intrigue a person by showing him a lion. Everybody knows what a lion looks like. They can watch it on television or in magazines but you have to show a lion in its natural environment and they don't know what a natural environment of a lion is anymore or of a giraffe or of an orangutan so the zoo's responsibility is really to concentrate more and more on the protection of the environment because that is ultimately what it is. So, what I'm saying is that zoos often just make lip service to their pillars of justification and very few zoos actually conform to all those issues but, in the end, it is a place for entertainment. You can't ignore the fact that ten

Place

percent of the world population visit the zoo once a year. Purpose

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I I want to come back just to the conservation role of the zoo. In all the times that you've been at zoos have you ever been part of projects where you actually could release animals back into the natural environment because of conservation programmes at the zoo?

P Ja. We had a programme, I don't know if it's still going on with the Ground Hornbill, which is a fantastic programme. We had a release programme, we used to collect eggs from Kruger Park, the [INDISTINCT] egg and they were hatched in the zoo under controlled conditions, the [INDISTINCT] and all that, and we had a release programme as well. We used to have the Lichtenburg Game Breeding Centre which was a seven thousand hector area and it's probably not in the wild but it's pretty much...those animals were not fed so those animals will...the one classical example that I will always remember is when I joined the zoo in nineteen eighty five, we had four Père Davids deer in a collection and when we had the Lichtenburg Game Breeding Centre...I don't know whether you've ever been there?

I No. Not yet.

P I understand it has now been closed down which is a great pity, but anyway, and this is a fantastic place and huge lakes areas and I tried to convince the staff that we should release them into Lichtenberg because the Père Davids deer is an animal that they assume was a marshy animal just by the structure of the hoof. They never had any evidence to that but they thought that this is an animal in the swamp area and I said let's release them there because of the lake area and they eventually managed to convince that we could take two animals, a

male and a female and I will never forget that time when we opened that crate and those Père Davids deer...they have been in a zoo environment by that time for three thousand years. That's the time. They've never been in a natural environment, ever, natural to their environment and they smelled around, saw the water and took off like veld fire and ran for that water and we then released the other two. We eventually had a population of about seventy five Père Davids deer and they would spend seventy, eighty percent of their time in water and you could see the line of the water on the line of the body whenever they come out of the water and, to me, that was incredible display of genetic behaviour, that even after three thousand years these animals realise that water is my environment and that was a good experience. But the reintroduction programmes is a very, very sensitive issue often subjected to a lot of criticism and sometimes justifiable. It's been sometimes carried out as a type of charismatic project which is really, really wrong. I know Fred [sic] Denay [sic] very well. He is the Chairman of the Reintroduction Specialist Group. He actually is in Abu Dhabi and he gave a fantastic presentation once in Taipei on reintroduction. What is your...how do you justify success of reintroduction? I'm a very positive...All my life I've been positive and I would say that if you have a one percent survival rate then it's a positive thing but there are very few good examples of reintroduction programmes. One is of course is the Californian Condor where San Diego Zoo managed to persuade the people to catch the last few, to breed them and release them back in the wild. So that's a very successful...but reintroduction programmes, in fact we sit now with the Arabian tahr, our flagship species, highly endangered species. We have the largest collection of Arabian tahr in the world. We have fantastic population growth. We have a very, very orchestrated breeding programme, genetically sound and we will soon have to think about reintroducing these animals back in the wild. I already have the President's approval for that, but you don't just release an animal in the wild if the

<p>circumstances that caused the animal to decline is still there Purpose and the second thing is that habitat must be prepared for...to receive these animals and of course thirdly, the animal must be prepared so, I know that many institutions where they breed where just to release them for the sake of saying we've release our animals. The Shwolsky Release Programme in Mongolia worked very well, very small number still. They still really haven't done it with the Père Davids deer. The Arabian Oryx, back in Oman was a great success until about five years ago where that whole project collapsed. They have now started reintroducing Arabian tahr back in parts of the Abu Dhabi Emirates, so it can work. For certain it can work but it's just not a matter of seeing how fast you can grow a population and then get rid of your surplus stuff so to answer your question again, we've been...National Zoo have been very actively involved with the... Previously, at the Johannesburg Zoo, personally I was involved with many reintroductions of barn owls, where we used to teach them how to feed live animals and then to release them. That worked also very well. We were also partly engaged in this South China programme a number of years ago. In fact, I spoke to Lee [sic] Kwon [sic] a few weeks ago where they wanted to...there were about twenty South China tigers left in the world, all in zoos and her ambition was to take cubs from these, bring them to South Africa, they import it to the National Zoo's Polokwane Gaming Centre and re-wild them so that they will be taught how to catch their own food, but I don't think that that project went any further because her idea then was once they've established that, to take them back to China but I don't think that has actually materialised to that level that she wanted it.</p> <p>I You mentioned earlier that you were part of getting PAAZAB off the ground but still today I think there are three or four zoos that are actually accredited PAAZAB members. So, what do you think is the biggest</p>	<p>Purpose</p>
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limitation for African zoos to comply to the PAAZAB standards?

P I was the founder of PAAZAB in nineteen eighty nine I think was the time and in fact I had a long session with Dave Morgan the other day and when I established PAAZAB, my intention at that time, initially and still is, to bring people together. I remember PAAZAB very vividly that when the decision was made to bring zoos of Africa together, I knew about five zoos in South Africa. I didn't know anybody else and even Halfway House at that time, the Halfway House Snake Park no longer exists there. Patterson, he was probably merely thirty kilometers away from Pretoria. I never met the man in my life. I've never know him. I've never visited his place, the same with Hartbeespoort Dam, good or bad, it doesn't matter. I never knew the place. I knew Johannesburg Zoo. I knew Bloemfontein Zoo. I knew about Bloemfontein Zoo, I've never been there, so the point was to bring an organisation together where you could meet and just join forces. It has grown considerably since that time and I'm very encouraged by that. I remember I said to Dave the other day how we struggled in those first few years to establish a code of conduct, bylaws and also an accreditation system. In fact the National Zoo was the first one to apply for accreditation. That was, I can't remember, maybe nineteen ninety nine, was it somewhere around there. We were the first accredited zoo. The problem is, to come to your question, and I personally when I was Chairman of PAAZAB, tried to convince the people and will still to this day do that. When you deal with a country like Africa and you bring in an accreditation system, you have to be very careful about that. At the time when we forwarded letters of invitation, I know the staff that I discussed it with, we argued for a long time whether we should send invitation letters only to those zoos which we thought were good and should we ignore the bad zoos? So I said no, let's bring everybody around the table and that's what we've done. We didn't exclude

PAAZAB

anybody. Now when you start an accreditation system and you set standards that's gonna eliminate your bad zoos, you failing in your accomplishment. I originally, and still to this day, thought that PAAZAB should adopt a five tier accreditation programme. It's like a hotel accreditation, five star right down to one star. And then if you're a one star, you wanna go for two star then you have to be able to have a full time veterinarian. If you wanna go three star, you've got to have a full time educational, so that is a way for zoos to aspire and those who do not want to do that will remain a one star. You can't stop it and it will be advertised that this zoo is a one star zoo and it's to their own demise if they prepared to go under that branding. But this zoo, is a five star zoo and the public will now have a choice. Do I wanna go to a five star zoo or do I wanna go to a two star zoo? And I think and I know that there is a lot of discussions and arguments...I'm no longer part of PAAZAB so I sit on the sideline and I watch with amusement and interest what's going on but I'm worried that...and I've express that opinion. Although the accreditation system is an excellent PAAZAB system, they should be very careful that they do not exclude those zoos that should still be part of PAAZAB. We've had the same thing with the World Association of Zoos. How do you accredit a facility? There's no standardised way of accrediting world zoos. There's nothing. I had that argument many, many times. The American zoos will have an accreditation system but they not prepared to move one inch to allow zoos like Malaysia to be part of it. Malaysian zoo accreditation would be very different to the American one, so in the international component, there's no easy way of saying this is the standardised accreditation system. So, that is the only explanation I can give why only three zoos are accredited. I know that there's been a lot of differences of opinion and happiness as well and I'm worried that they may lose members as a result but I really...I still think that, in a continent like Africa in particular, you should have a grading system.

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I Ja because you are off the record you hear about breakaway groups and people wanting to do their own thing.

P Ja and I wouldn't be surprised.

I I would just like to come back...you mentioned earlier how important you see the education role of zoos, what is the change you want to see in communities because of zoo educational programmes?

P I think especially in...I just want to say Africa but certainly South Africa, I'm still really stunned when I experience the level at which people respect the environment. And environment can be anything from pollution to disregard for the environment and simple things like that and I say again, it's a source of energy that one has to exploit. I can't remember now with my days in the National Zoo I think we had something like two hundred and fifty thousand school children every year and, to many of those people, the whole concept of Environmental Education does not really exist. They don't have an understanding of that. We tried to...I tried to establish a reach out programme. In fact I started the zoomobile issue as well. I don't know whether it's still functioning.

I No. It's not.

P That's a pity because that whole purpose of that was I managed to get that Sprinter donated to the zoo that you reach out to the community. Go out and educate them on the ground. You don't have to necessarily bring them to the zoo. We had a reach out programme with...what's it? Naidoo, the horticulturist. Derek [sic] Moodley [sic] to establish gardens in the townships. Go out and help these guys to plant trees, work with Trees of Africa. So, ultimately, I don't expect...I've often in all my years in conservation been confronted with what can I

do for conservation? What can I do? Well, you can't save the white rhino. You can pledge your support and you can keep the guys by their legs but you can't...the individual can't say okay, I want to save the white rhino but you could do a hell of a lot in your own backyard where you can practically demonstrate a simple environmental...this area, Silver Lakes, is paranoid about recycling and I'm so...I've never recycled in my life but now they've got different type colours of dustbins and you do that.

I Because you have to fit in.

P Absolutely. And it's fun. It's really fun. So there are ways where a person can make a contribution to his environment. I don't expect the educational programmes at your zoo or any zoo should result in the guy that walks out to say I feel so encouraged now I'm going to kill poachers. It's got nothing to do with that. It's to encourage that person to understand this whole cosmos society that we live in. And, really, I said to people often, I don't want to go to international conferences anymore because I come back so demotivated to listen to how the environment is being destroyed. You take the palm leave, palm oil [INDISTINCT] [CROSSTALK] and who causes this? Not those guys but us here, in South Africa, in America. Those are the person that helps destroy the forest of Malaysia. We are the people who help destroy the forest in Brazil, the pollution of the waters. And if there's not a paradigm shift in our whole attitude towards our environment and that is to why...you can still teach a person about a giraffe that has got nine neck vertebrae like any mammal and all, that is good, it's important. That's what the school teacher can also teach them. I had a wonderful visit many years ago to the Bronx Zoo where they had probably like a children's zoo. I don't consider it a children's zoo. They had the different senses of the person and they would tell you the sense and they would...you could practically

participate in something that would illustrate that. That makes sense to the child. So that type of interaction is a keyword towards bringing the people more interested and susceptible to learning and ultimately we used the term, when I was still in the National Zoo, every person that leaves the zoo should be an ambassador for conservation. And that's what it is really. That's what the education programme should do. Not necessarily to give them a quiz programme to say is the lion bigger than the tiger. That's got...it's what I call it useless information. It's interesting at that time. That person must get out of that zoo encouraged to go to his own backyard and start practicing conservation, environmental conservation. Purpose

Purpose

I And our last question here is, what is your opinion on the existence of zoo today in modern society? Is there still a place for zoos?

P Ja and I think, as I've said in the beginning, zoos will continue to play an important role and hopefully and certainly I also see that in a changing role. We are environmentally faced with major catastrophes that's gonna happen all over the world. We know that global warming is [INDISTINCT] and it is happening already and the ones where it's going to be hit worse will be the environment and the animals. So, sad as it may be, zoos will still be the last bastion for many species and even if it's just reservoirs for future use, even if it's just the frozen zoo concept, at least it is an opportunity to protect and to save that [INDISTINCT]. I think we all heard the phrases of the arrival of mankind in terms the whole species of the evolutionary process that we actually made our arrival on the last second of the last hour of the last minute of the last day. So there's been some changes in the environment. Through all the years there's been some catastrophe, the destructions, the reptiles of old. This is an evolutionary process. So you can't stop that but you can prevent man-made catastrophes and, genetically

speaking, we are fragmenting populations more and more because of man-made barriers that we create. So other than just being an entertainment area, zoos still are the last bastions for endangered species, not necessarily to show a person what an endangered species look like but as a genetic reservoir for once things get better. I'm encouraged, for instance, when I heard recently of a decision to extend the national parks of South Africa, which is fantastic news. That gives greater opportunity for us to reintroduce animals back into the wild. So where will those Place animals come from? And that is certainly a role that zoos globally can perform.

It's mind boggling when you...some of the statistics I shouldn't mention, should not be quoted but if we have to release information on some of the animals that we have in our collections in the UAE and in our own collection, we will rewrite the red data book. We will rewrite it. If you take the animal populations in Texas, I heard the other day it's enormous. Arabian oryxes, Scimitar-horned oryxes that the ex situ breeding programmes far exceeds the in situ population so it is a reservoir which ultimately will fulfill a very important function. Sorry, let me just check...

I Ja, okay.

P Ja, we were talking about the positioning of a zoo in modern society and the role it will continue to play and if you have to take a step back and see what zoos were like a hundred years ago and the incredible change that happened in zoos in that time, it certainly shows that zoos are...good zoos are fundamentally committed to improving their own facilities. The National Zoo is an example of that. If I have to take you on a tour of the national zoo, you wouldn't believe what happened in the time and it will continue to happen. It's a continuous process. We used to have about five new projects every year so it was a major...and zoos do that. In fact, the Bloemfontein Zoo is going to redo themselves now I believe. So they understand that they have good zoos, they

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understand that they have to improve themselves to be a place for people still to enjoy. Zoos cannot maintain themselves as zoos of a hundred years ago. There is no place for such a facility. Nothing whatsoever. Zoos may reduce the number of animals in order to create larger exhibits for them. Zoos do collaborate worldwide which is very, very important. There is a very good cooperation in terms of managing populations as [INDISTINCT] animals so it's no longer in isolation. It really is you managing a world population. So, I have often said, don't look at the so many gorillas that you have in the national zoo but the so many hundred gorillas that you have in the world and that is the population that you have to look at and that is the population that you will draw from eventually if need be. So zoos, as long as they continue to function internationally as a co-operative body and to work together towards conservation, they will continue to play a major role and must exist. There are many...I did a paper once some time ago and I calculated just the other parts of the importance of zoos. It was incredible and my, I think my conclusion that I made was if we have to tell our visitors to stop drinking Coca Cola, we will close down Atlanta in five days. That is the value of zoos. I worked out the manpower of zoos. It runs into millions of people in employment so we talk about should zoos continue to exist. So if you close zoos, you gonna have millions of people out of a job. Capital development of zoos runs into trillions of dollars. It's amazing if you start adding those things together. So, other than the conservation value and all those beautiful things, as an industry, zoos fulfill an incredible part of the social environment. You can't just close down a zoo in terms of worldwide things. It will have catastrophic effects on the economy. Place

Place

--- END OF AUDIO ---

Interview: Chief Executive Officer of Johannesburg Zoo (D4)

I Good morning X

P Morning

I Thank you so much for giving me some of your precious time for this interview. Can you just –

P Pleasure

I ...please tell me what is your position at the zoo?

P I'm the Chief Executive Officer of the Johannesburg Zoo.

I Can you please tell me how big are your zoo? How many animals do you have, how many species and so on?

P We are fifty-four hectares in size in the City of Johannesburg and we...sorry, I'm just listening to that noise. And we have just over one thousand eight hundred animals of about three hundred and sixty species

I Three hundred and sixty species? Okay, so we are actually quite bigger than you at Pretoria Zoo in comparison?

P Well you've got lots of fish and small things.

I I think so.

P When we open our Temple of the Ancients we'll have a lot more but ja.

I Ja, okay, yes

P But yes a national zoo is a lot...has a lot more species

I When are you going to open your aquarium?

<p>P Hopefully...it's still about another year before we open.</p> <p>I Oh, okay.</p> <p>P Clearly because we're waiting for those acrylics to be completed.</p> <p>I Okay, so that's an exciting project?</p> <p>P Very, ja.</p> <p>I How many visitors do you see annually?</p> <p>P Last year we saw five hundred and fifty-two thousand and we're seeing a steady increase from two thousand, two thousand and one where there was two hundred and eighty-nine thousand visitors, so there's been a steady increase.</p> <p>I Increase. Great and how many of them are school learners?</p> <p>P Annually between hundred and forty and a hundred and eighty...a hundred and forty, a hundred and seventy thousand depending on the year.</p> <p>I Tell me for those learners do you have a small programme for all of them or do they book programmes?</p> <p>P No we have booked programmes so if they want to do a specific education programme they will book it. Most of our learners, and I think this is one of our big faults...let's not say it's a...no, it is a fault, so I think every learner that comes in should have an educational programme attached for their visit. Recommendation. However one mustn't underplay the...it's just the assimilated learning, just by standing...if it's the first time and you're a meter high and you're looking at an elephant that's way up there, that's an experience all on its own.</p> <p>I Exactly, ja.</p> <p>P And then we hope the teachers actually teach them but I have my doubts in those big numbers and in an open environment.</p>	<p>Recommendation</p>
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<p>I [INDISTINCT] the zoo?</p> <p>P Some do. I hear them teaching their children but a lot of them don't.</p> <p>I That is what I actually could really appreciate at Uganda [INDISTINCT] because there they have...each and every child that comes in will get interaction with the education officers. I think that could be something that we can all strive to. It's just amazing, they have thousands of children and they take them all on a guided tour and they get a lesson as they go through, that's actually magnificent the way they do it. What do you...according to you, what is the main purpose of the zoo?</p> <p>P Sorry, I'm gonna have to stop this noise. John [sic]! [INDISTINCT]</p> <p>I It's not working. Okay, let me stop and then we can continue. [INDISTINCT]. Great, okay.</p> <p>P Great we can start again.</p> <p>I Let me see, can I just – I just want to sort this thing out, it's recording now. Okay. Coming back to your personal opinion what is the main purpose of a zoo?</p> <p>P There's lots of opinions about the main purpose of a zoo. Obviously we've moved on from the stamp collections that we used to have in the past so what are we doing to the future? And I think zoos are a little bit confused at this point in time because they obviously have the...for those who belong to the Wilderness Association of Zoos and Aquaria, we have a conservation strategy that we follow. It was published in two thousand and five, the World Zoo and Aquarium Conservation Strategy, and that's what we follow as a zoo and what is probably the most critical to our survival going forward, so we all understand that. I think a lot of what we mustn't forget is that we actually do have a facility that people come to relax, come to be educated, come to sometimes just watch the animals, purpose that's...so there is the two components to it. However...and we can't survive without either component so we need to make sure our house is very well looked after when it comes to that and, if it is well looked after, our conservation research will go a lot better so you could ask me as a CEO what is a zoo to be, clearly conservation and research. There's no two ways about it however if you're</p>	<p>Purpose</p>
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going to run a good facility you must not forget about the –

I [INDISTINCT]

P ...other aspects of what you gonna do.

I And the recreation and education.

P Exactly and we mustn't make excuses for that. We are a facility that has people and I think the attitude we need to take is that our zoos need to be our home bases for our conservationists, so if we're going to have a zoo, yes, we are going to get animals and yes we are going to keep animals for specific reasons but it needs to be understood that it's...in the long term, it's only going to be a home base for everything going out in the field and it's a place for our researches to come and do their work, come and extend their work to the public so, yes, one needs to be very aware of that. Purpose

I So do you have an animal collection plan at the zoo?

P We do.

I So each animal has a specific purpose in the zoo?

P Yes, we...although it's not running according to plan at this point in time because collection plan takes a long time. If you've got a...let's say...let's take an elephant's not part of your collection plan you can't suddenly move the elephant somewhere else. The elephant lives many, many years so your collection plan has to evolve according to your list of animals that you do have into what you want and then we decide on...we have a flow diagram to utilise to decide which species where will we keep and it ranges...most of the flow diagram direct you to choosing conservation based species. Of course if it has a good display of value it helps or if it has a good conservation value it helps, so those are all the things that make you decide eventually what you want to put in your collection plan but, yes, we do have a collection plan and collections plans are not only around your conservation. If you're not careful you can have three hundred animals in an enclosure when its capacity is only

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six so that's part of your collection plan is to make sure that you manage your animals correctly as well.

I Did you mention just now WAZA's conservation strategy? How do you compare, how does Jo'burg Zoo compare to the rest of the world to Europe and the USA, to the zoos there?

P We, with a minimalistic budget, an absolutely tiny, ridiculously small budget do a lot of conservation. A lot of conservation projects although many of them are still in the infancy, I believe this...these are the building blocks that we are going to be doing in the future and our conservation projects aren't simply giving someone else money to go and do it, it is our staff that are doing it.

I Your staff are involved in –

P Are involved, ja. When we get rich as a zoo we'll hopefully employ more field...we'll employ...we don't have many at this point in time but we would like to employ field conservationists in the future but at this point in time our staff are expected to be, at a certain level of course, are expected to be involved in conservation projects and, although some of them are not at conservation level yet...let me give you an example, our amphibian project.

I Ja?

P All the work we've been doing to date, and we've been working on it for four years now, has been on species that are not endangered or not...don't have a major crisis out there. However, learning the techniques to breed them is gonna give us a possibility to save certain species. Purpose

I Okay, ja.

P Now we're about to start on our first critically endangered frog species and I think what zoos can do very well is we're able to communicate with other organizations. Purpose So when we dealing with a frog, which is called Pickersgill's Reed Frog, we don't work on our own. We make sure that the field conservationists currently that were there, be it in the private sector or in Ezemvelo KZN Wildlife, we work with all of them as well as with universities, like North West University, and so we make sure there's a lot of partners involved in the programme

and that's how we get our conservation projects to mean something in the end is that we don't just go in and try and do it on our own. We make sure it's a holistic –

I Collaborations.

P ...holistic approach. I think as time goes along and we got more funding we will obviously assist, for example, the government departments to do more conservation but that takes time and we're a municipal zoo. It's not like we're tapping from major funding areas so we have our restraints.

I Ja. Tell me, have you been involved in any breeding programmes where you could actually release some of these animals back into their natural habitats?

P The...let's have a look.

I I know about your Wattled Crane project that you're quite famous for.

P I would say where we've been helped for releases is more our veterinary department has been involved with, for example, vultures and black eagles. They do the repair and the rehabilitation...let's say they do the medical work and the rehabilitation gets done by the rehabilitation organization then they get released so that's where we play an immediate role at this point in time. Purpose We have two projects that will be considered for release in the future other than that. The first one being the Wattled Crane Recovery Programme. All we're shorting now is a puppet rearing facility down in Natal and then we'll start our first releases. So that is around the corner but that's taking years to get there. We've built up our captive population, now it is the females. We now have enough females so we don't need to have any more from the second egg collections in the wild. However we're still short of males so we'll still be collecting males and the females that we've pull will be released and then obviously any that are bred in captivity will be released so that's very close. The frogs, a lot of what zoos will do is hold arks as they call it. If that species go extinct in the wild you can reintroduce –

I For example the [INDISTINCT] in Tanzania.

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<p>P Yes, exactly. The [INDISTINCT].</p> <p>I Ja, I think that was the Bronx Zoo that's starting –</p> <p>P Ja.</p> <p>I ...that one</p> <p>P The trick is of course if it goes extinct in the wild is how do you put it back? However the Pickersgill's Reed Frog, we hope won't go extinct, however we may be able to relocate it into different areas from different sites in KZN while breeding a population in the zoo so if anything goes wrong we can breed that type of frog. We know we can breed in its hundreds and thousands so we can reintroduce if required but we would not do that until it is agreed to by all parties and that's really a requirement to do that.</p> <p>I Yes. Do you do any tissue banking for example?</p> <p>P We do, with the -</p> <p>I [CROSSTALK].</p> <p>P Lots. We must be one of the bigger contributors to that.</p> <p>I So, in your personal opinion...now not just Jo'burg Zoo, in general, do you think that zoos are in fact really contributing to the conservation of endangered species?</p> <p>P In South Africa or abroad or everywhere?</p> <p>I All over.</p> <p>P Yes absolutely. Some zoos are doing just phenomenal work. The amount of money, resources, education they're putting in is mind boggling. The zoos are now the third highest contributor, funding wise, to conservation in the wild which is quite a phenomenal fact and it's probably understated. I know some zoos specifically that have made critical differences. Absolutely critical differences. Is it enough? No.</p>	
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I Ja, and in South Africa?

P No. Zoos in South Africa are way behind. I think between us and the National Zoo we'll probably eventually get there. Because you are from the National Zoo I have to be careful how I phrase this.

I You can say whatever [CROSSTALK].

P The National Zoo is more into research, if you know what I mean. Research conservation whereas we're more in a field, sort of. That's maybe not accurate either but [CROSSTALK] –

I But the research also, is that research really zoo based? Is the zoo really necessary to do that research or can one do that research without a zoo?

P Oh for sure.

I Exactly so why then say that –

P [CROSSTALK] university, ja.

I So my question there is why saying that one of the reasons for having zoos will be researched if in fact I think the...I don't know of any research project in our zoo in the NZG that is actually making use of the animals in the zoo for research so meaning you can just well do the research –

P Whereas we do that to a large degree.

I So you do use the animals in your zoo for certain research projects?

P Not structured like the NZG does. However our research is involved in...let's take hyperolius pickersgilli, which is a type of reed frog. We've bred it like to the third or fourth generation, so now that's the research done so when we get the critical endangered species in it's not easy. And this is what you do, this is what you do, this is what you do. So that's the kind of research we do. We don't do specifically peer reviewed articles or...and that will come a time as our curators and keepers become more experienced but the whole idea

is these guys here have all studied diplomas in nature conservation. They all studied degrees in zoology, they're all looking to do their BTechs or their Masters or something. They must be doing it. You mustn't be calling someone else out there to do it. However, the universities are extremely keen to work with us. So should we get a PCR machine, I think we could spend our money better. I know a place like Omaha [sic], for example, and [INDISTINCT], they have all that beautiful equipment and it's just amazing and they are using it and making a difference in their zoo. So you should actually ask them some time, they –

I I think so because I do think that they will –

P They're very much structured like what NZG is and the work they do is amazing and that's not just linked to pure research, it's linked to conservation in the wild, linked...they did a lot of work in Madagascar. They're gonna be responsible for conservation of a lot of Madagascar by the time they're finished and that's a zoo so...

I Do you think that is something that we should aspire to?

P I've always wondered about that, I've looked at the amount of research that the National Zoo does and the amount of...I've always been of the opinion we need to stick more to conservation based work but I may be wrong.

I No well I'm asking those same questions because I'm just looking at our zoo and thinking why are we a national research facility? We are a zoo. So that's just also the reasons why I'm asking these questions.

P You see it is a zoo trend to become a research and conservation facility, that is a trend worldwide. It's not unique to a national zoo so – Purpose

I But you don't see Jo'burg Zoo doing the same?

P No because –

I That's not what you want for your zoo? You want to focus on conservation?

Purpose

<p>I Money and skill?</p>	
<p>P I've travelled all over Africa. I know, it's money and skill. PAAZAB</p>	<p>PAAZAB</p>
<p>I Okay. So do you think it's worthwhile having PAAZAB there if all the zoos...I don't know what...I think it's Giza Zoo also has PAAZAB accreditation but looking at Giza Zoo then you can actually ask why do they have this accreditation and –</p>	
<p>P They don't have it.</p>	
<p>I Don't they have it? Okay.</p>	
<p>P No.</p>	
<p>I I know our zoo was quite involved in helping them –</p>	
<p>P Us as well.</p>	
<p>I ...to up their standards but –</p>	
<p>P But they're not accredited?</p>	
<p>I Is there any other zoo that has it? Except for zoos in Africa or South Africa?</p>	
<p>P The only zoos that have it is us, Congo and National Zoo. Those are the only ones.</p>	
<p>I So it's three zoos in Africa?</p>	
<p>P Ja.</p>	
<p>I So why have it? That's my question, I just wondered.</p>	
<p>P You need to strive for what's right. If you see the zoos that I've seen, you need it more than you can imagine. Recommendation</p>	<p>Recommendation</p>

<p>I Ja, that's not research, that's not conservation, that's not education so you know why are they there?</p> <p>P The zoos?</p> <p>I The zoos.</p> <p>P God, who knows. Oh I can tell you why they're there –</p> <p>I To make a little bit of money</p> <p>P A lot of them were there from the...no, no, no it's not that at all. A lot of them are there from the colonial sort of like days and I think people just wanted menageries and it was a status symbol in those days. They're not evolved to maybe money making and they don't...up in Africa it evolved to where do we take this destitute animal? Let's go dump it at the zoo. So half the animals at the zoo up in Africa are just dumping it on their doorstep and somebody has to look after them. So let's say if they close the zoo down, those animals are just...where are they gonna go? Place</p> <p>I Ja.</p> <p>P And before you know it they will be open again because somebody is trying...they found cages and here's somewhere where they can put the –</p> <p>I Animal.</p> <p>P ...animal.</p> <p>I Well okay so take away the three zoos that you have mentioned now. Do you think the zoos...actually zoos in Africa now have the best interest of the animals at heart?</p> <p>P A few people in the zoos always have the best interest of the animals at heart. A lot of them are there just to earn a salary in Africa which is different to Europe and the States. They really are...it's not a passion for them, it's not a love for them it's just there to take the pay cheque home or get a bit of meat every day because</p>	<p>Place</p>
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<p>you don't get paid for six months. That's what happens up there.</p> <p>I Ja.</p> <p>P What is your question to me again? Do we think –</p> <p>I Oh do they have the best interest of the animals at heart?</p> <p>P Ja, they probably do. You know the people I've worked with here they do but –</p> <p>I It's just a problem of not having enough money, say, to have proper facilities. Threat</p> <p>P Money and its –</p> <p>I Skills, ja.</p> <p>P ...facilities and its skills ja.</p> <p>I How do you see Jo'burg Zoo's role in Conservation Education or environment?</p> <p>P Huge.</p> <p>I Is it huge?</p> <p>P Absolutely huge. If I had to guess, I wonder if eighty percent of Jo'burg would get to go to the Kruger Park?</p> <p>I Not, ja.</p> <p>P Probably not. They can't afford it and, probably, many of them will never afford it in their whole lifetime. Kruger Park's not cheap to get into so where else are you going to have an experience with an animal? You're not going to have DSTV either so...</p> <p>I Ja, okay. Well you do apply to PAAZAB accreditation so actually I think you will have an education policy, you will have education strategic plan so I'm not going to ask you those questions. Do you think that you</p>	<p>Threat</p>
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Conservation Education?

P My...when me and Louise [sic] sit across the table it's always to reach more people, absolutely reach more people. We always talk about more and more surveys. How do we get people involved, I suppose, is the other way. Putting more resources towards education. That is what is going to save us in the long run.

I Put more money towards it?

P Mm.

I Ja, sometimes I also feel that, especially at our zoo, it's one of the pillars for our zoo. The one is education and research and conservation but then we don't get the money in comparison to what research we get.

P Mm, we've just changed to a community development department so I'm hoping our funding will go greatly into that sphere because –

I That will be great.

P ...to me that's just...just look at those little kids out there.

I Ja.

P And that's where you gotta makes the difference.

I You have to, ja.

P How else are they going to get it?

I You know what they do at UWEC? They have...but they volunteers or field or work...they pay them a little bit but it's qualified people and they go on a two months' training programme but they have about twenty standing by the gate in a row and as the school groups come in they take fifty kids per field guide and then they take them on that guided tour and it's a nice intensive programme. I really want a lot out there. I wish we could

Recommendation

do the same. I'm trying to convince Ulrich [sic] that we must do the same. He doesn't want to buy it. I'm still working on it

P That's what has to happen.

I I think that's what is so...it really is working for them.

P Ja.

I They are a zoo but they are called UWEC Environmental Education Centre. That's their main purpose, is education. Okay the last question, do you think that zoos still have a place in modern society?

P I ask that question every day of my life. I really, really do ask that question. As an animal person, I wish I could oversee everything in the wild, that to me would be –

I Exactly.

P ...would be ideal so maybe I'll give you a reason why I think it's okay. I kept many animals at home when I was young. I've done very intensive work with animals training as a veterinarian. I understand animals very well now I think. You never do fully but I understand animals pretty well and I understand when they stressed and when they're not stressed and you can create a zoo where animals are just...are not stressed, to a large extent are not stressed, so if you do that then you're okay but I'm working with a zoo that's one hundred and seven years old. Things are not perfect and that is very frustrating for me and that's what makes me doubt sometimes because I know what they...what some of them should have I can't give it to them and so [INDISTINCT] a future in the future, absolutely yes just do it properly. Recommendation

I Ja.

P Do it properly

I If you can do it properly, yes.

Recommendation

<p>P Everything must be large enclosures, you must have your five freedoms and if you got that, absolutely.</p>	
<p>I Okay thank you, thank you very much.</p>	

--- END OF AUDIO ---

Interview: The Executive Director of PAAZAB (D6)

<p>P Is the recording volume sufficient?</p>	
<p>I Let me just see. I hope so. Its working and I just hope that the battery lasts. X, thank you very much for giving me some of your time. Let me just see my first question here. The phase admission statement you have on your website is Africa Zoos and Aquaria internationally recognized as being effective and trusted centres of animal welfare, conservation, education, research and service. How do you intend to achieve this?</p>	
<p>P How long have I got to answer that question?</p>	
<p>I As long as we can record this.</p>	
<p>P It's going to be a multiple faceted approach at the end of the day but core to it will be really the training of zoo professionals because it is only through developing core competencies in animal husbandry, welfare,</p>	

maintenance, service provision, research conservation, education, all the rest of it that we can ever possibly have to retain that mission. We've got develop a category of professionally orientated people and in doing so then we will most certainly add to our overall credibility as conservation and education and research organisations. At this point in time, of course, we don't have a formal educational processes for the training of our personnel -

I Yes

P ...but within PAAZAB, of course, then we're in the process right now of putting that in place. First of all with the PAAZAB, aka basic competencies certificate which we will be an NQF level two, but we will be migrating that one up to a series of other courses at a later stage during the course of two thousand and twelve for an NQF level four and ultimately we are looking at an NQF level six to seven level.

I Okay, yes

P So that's part of the strategy that we'll be looking at going forward in that. That's one element of this. The other element in ensuring the zoos themselves become trusted centres, as the statement says, is that we need to increase our operational standards and the way that we are doing that within the association now is the promulgation of what we refer to as the PAAZAB mandatory standard. This is a standard now that is mandatory compliance for all our institutional members, so if you wish to retain your institution and membership status you have to demonstrate compliance with this standard. We have developed this standard directly from the South African National Code of Zoo and Aquarium Practice document otherwise known as SANS one oh three seven

nine. One oh three seven nine was written by PAAZAB personnel in collaboration with the NSPCA and that is a documented and gazette South African National standard. The only problem with it is one the compliance with it is voluntary, so there is no –

I Okay

P there is no imperative, no legal imperative, to be compliant with that standard so what we have done as an association is that we've taken our standard, we've beefed it up quite a lot, we've put a certification process in place, which is something that SANS one oh three seven nine does not have, and internal certification process and we've trained a bunch of auditors within PAAZAB who are now qualified to audit against that standard. We have forty institutional members. All of them will now be required to be audited against the PAAZAB operational standards. The only exception will be our accredited members of which we have four.

I So you have four accredited members?

P Now accreditation...the PAAZAB standard accreditation and PAAZAB operational standard are two quite different things. Accreditation is voluntary –

I Okay

P ...so, again, there is no constitutional imperative within the association to do that, it's something an institution may chose to do or not to do and at this point we only have four accredited members. PAAZAB

PAAZAB

<p>I But now looking at how many zoos that are accredited do you have in the whole of Africa?</p>	
<p>P We have forty institutional members. PAAZAB</p>	PAAZAB
<p>I Forty Institutional members?</p>	
<p>P In twelve African countries.</p>	
<p>I So my question now...sorry I'm interrupting you now. So if only four can reach the accreditation or can achieve to what your standards are, isn't it...what is the question?</p>	
<p>P Those are the four that chose –</p>	
<p>I They chose to be. So the others don't want to be?</p>	
<p>P I can't answer that question I think would be the easiest way of responding to that. Yeah, I guess so. They have not –</p>	
<p>I Do you think it's because of their standards are not good enough, are not...the zoo itself perhaps doesn't comply to your standards and they know it?</p>	
<p>P I will say that the PAAZAB standard of accreditation is internationally comparable but then so is the mandatory operational standard. That is internationally comparable as well. There's slightly different emphasis with...on the two different approaches. It is our ultimate intention within PAAZAB to make operational standard and accreditation the same thing. So the two processes will eventually merge but our priority right now is to get everyone to operational standard. Or at least a critical mass of PAAZAB members. We are cognisant of the fact</p>	

that several institutional members have indicated that they will not even attempt operational standard. That will be their choice but PAAZAB membership has got to mean something.

I Why do...but say, you can be a member without being accredited. Just explain that to me now.

P PAAZAB has several categories of membership but bearing in mind that we are a zoo and aquarium association. The main core of our membership, or what we refer to as institutional members and our constitution defines what an institutional member is. I can't recite it off the top of my head now because it's quite a lengthy definition. Then we have associate members, affiliate members all the way down to individual members but only institutional members have a vote and institutional members set on PAAZAB councils so the other membership categories really obtain some membership benefits but, by in large, they have no say in the administration association at all whereas institutional members do and what we have said to our current institutional members is that if you are not prepared to demonstrate with your compliance with PAAZAB operational standard we will downgrade your membership to associate level and if you want to stay there, that's gonna be up to you. You will have the opportunity, of course, of becoming an institutional member again but you would have to be audited and you will have to demonstrate compliance with the PAAZAB operational standard. We're doing this for another reasons. This comes back to your central question of how we are gonna make zoos trusted centres.

I Ja.

P The only way we are going to make the zoos trusted centres by actually demonstrating our competence at what we're doing and this is the way we are going to do that. We have to show that we are capable of a

standard of competence, so training is the one but then we also have to demonstrate that level of operational competency and the way we can do that is by using a mandatory operational standard so it's very interesting. I would say that the association, by and large, PAAZAB counselors have agreed to this. That was passed by a majority vote. So from that we can infer that the majority of PAAZAB members want this and are prepared to undergo it and the feedback I have received from the bulk of the membership is exactly that. There are some members that voted against operational standard and they are ones that have directly and indirectly communicated to me that they are not going to be interested in pursuing it. Well that will be their choice if they wish to retain their membership within PAAZAB. In doing so, of course, once we've done this, once we've started producing the professional training that we're looking at and also the operational standards and credit compliance, I believe then we'll be able to stand up straight and say, ja, we stand for something. This is the line in the sand. Our members are this side of the line, our non-members are not. They then become, bona fide, sub-standard zoos.

I Ja, exactly. Okay so maybe we have...maybe this is now a little bit for repetition but, I if ask you this, why do you think or what do you think is the biggest limitation in Africa? The African zoos in complying with PAAZAB standards.

P Its capacity, is one, resources, two, and intent, three. By intent I refer to political will. I've just come back from Zambia. I conducted an inspection or a trial audit of [INDISTINCT] zoo just outside Lusaka. I'm often...people will often say to me African zoos will never be the standard...they will never be the standard they need to be. I disagree, I flatly disagree. One of the best benchmarks that we could be looking at for zoos within

Africa is that hospitality industry. Now, I'm referring to food and beverage and hotels. I stayed at a hotel now in Lusaka that was an international standard and, as I pointed out to the current manager of the zoo in Zambia, there's your benchmark. If they can do it so can you.

I Of course, yes.

P And what it boils down to is training as well. The rating of professional standards and so on and so forth so it's not always just about money it's got a lot to do with attitude.

I Intent.

P Intent.

I Ja, okay. What would you say is the main purpose of a zoo?

P I...zoos are multifaceted organisations and end up having multifaceted...produce a multifaceted product at the end of the day but I would have to say that my feeling is that the main function of the zoo right now is to be the inter-phase of connecting people with the natural environment. It's very easy to say that we now live in an age of very, very high quality and high density television programmes and big game reserves and that sort of thing but in our African situation the need for zoos, I personally feel, has never been greater and I qualify that statement by making the observation that sixty percent of African populations, I'm talking about all fifty-three countries that comprise this continent, sixty percent of those populations are completely urbanised. I was once asked the question the other day, why do zoos...why does Africa need zoos at all when they have these huge bits of roaming game and so on and so forth? **We need zoos in Africa for exactly the same reason that Europe**

does. We have urbanised populations that cannot afford and will never during the course of their lifetime ever get out into those game reserves to see those wild animals and if we're going to instill any value, any conservation value, into our populations to make them understand how important environmental issues, conservation issues, are then they have to have access to some level of contact with animals and that's where zoos and aquariums come in. They provide that and I would foresee the absolute need that zoos start developing far more comprehensive ambassador animal programmes to allow people a greater level of contact to make that mental and, most imposed importantly of all, emotional connection because unless they do that, then we really don't stand a hope in hell. Place

I Ja.

P So the short answer then for that function of zoos as my colleagues [INDISTINCT] connecting people with nature. Place

I Ja.

P You have to do that.

I Thank you and do you think that zoos are, in fact, contributing to the conservation of endangered species?

P Well I think the...again the short answer to that is this we estimate that there are between ten to fifteen thousand organisations...facilities out there on this planet that go by the [INDISTINCT]. Only eleven hundred of those fall within the World Association of Zoos and Aquariums' ambit. Of those eleven hundred zoos, between

Place

Place

Purpose

them they generate three hundred and eighty million US dollars a year that is fed directly into in situ conservations. That's more than the worldwide life fund. So do zoos contribute to the saving of endangered species? Unquestionably. Purpose

I Okay

P And in a significant and meaningful fashion. Quite apart from in situ support there is, of course, ex situ support and we see collaborative species management programmes all over the world amongst the regions and the associations, some more successful than others but that is affectively breeding species in captivity to maintain assurance populations. Some are very successful, some are less than successful but they all, one way or another, contribute to the ethos of saving of endangered species. It extents all the way back to animals like the Przewalski's Horse. If there had not been ex situ populations of that there would not be re-introduction programmes in the Gobi Desert which is happening right now and those are completely zoo-based. Black-footed ferrets in North America, golden lion, tamarin and the list goes on.

I Ja. Thank you for that. How do you see the role of zoos in terms of research?

P Zoos are unique organisations in that because, to use an expression I used earlier on, their multifaceted approach. They are actually capable of supporting high levels of research. But research in its broadest capacity...there can be in situ conversation research, they can be ex situ zoo research, there can be marketing research, there could be [INDISTINCT] studies so in terms of the World Zoo and Aquarium conservation strategy research is listed as one of the legacy of a zoo function. I will endorse and support that.

<p>I Ja, okay, recreation?</p>	
<p>P Zoos have a very strong recreational function. If we are going to instill a conservation ethos into our urban populations, we're not going to do that intellectually, we're going to do it emotionally and the only way you're going to do that is through providing some sort of recreational output. You need to bear in mind that the reason that people come to zoos is not because they want to learn about animals, they come for fun. Purpose</p>	<p>Purpose</p>
<p>I Ja. Okay, do you think that zoos serve the best interest of animals, generally speaking now?</p>	
<p>P If they don't, they should not exist and I'm emphatic on that. How widely that is practiced, of course, is entirely debatable but animal welfare has to be a corner stone of a zoo operation and if it isn't then that zoo needs to be reevaluated in what the hell it's doing. At the end of the day we need to bear in mind, of course, that animals themselves might not necessarily need zoos and the ultimate function of a good zoo is to put itself out of business and take away the need for there to be zoos at all and in which case then we will be back at the Garden of Eden situation.</p>	
<p>I True</p>	
<p>P Something we all devoutly hope for but zoos are actually for people, they're not for animals per se, but in serving that function they have to be to the benefit of animals and, again I repeat myself, if they're not then...if a zoo is not practicing animal welfare to the benefit of the animals at all then it should not exist, it should be closed down.</p>	
<p>I Do you as PAAZAB any way of controlling the...saying on your inspections wherever you go, you see</p>	

<p>things happening to animals, what can you do about it?</p> <p>P It boils down to operational standard. Fifty percent of the operation standard itself, the audit form, deals with animal welfare issues...animal welfare questions pertaining to husbandry, maintenance and their care so to be compliant with PAAZAB operational standards would mean that you would have to be practicing at a very competent level of animal welfare and if you're not then you will lose your PAAZAB institution status.</p> <p>I Thank you. Where are African zoos situated currently as far as Conservation Education?</p> <p>P I found, by and large, that the majority of African zoos that I have visited actually have very strong Conservation Education programmes comparatively speaking and Purpose I'm thinking of places like [INDISTINCT] Zoo in [INDISTINCT], they have an entire education department, Mvog-Betsi Zoo in Yaoundé in Cameroon, also they have more education staff than they have keeping staff. So I would have to say that the majority of African zoos that I have visited do fully understand their Conservation Education role. Purpose</p> <p>*****</p> <p>I Okay thank you. Do you think that the Conservation Education programmes of zoos in Africa achieve what they are intended for? Do they achieve their aims and how do you know this?</p> <p>P I don't know what would be the answer to that. I know surveys conducted in Europe and in the States have shown fairly conclusively that education programmes in zoos are not as successful as we would like them to be and I guess the proof of the pudding is this planet wouldn't be in the state that it is in if it were being successful but there is a definite need for self assessment and evaluation of the programmes that we're</p>	<p>Purpose</p> <p>Purpose</p>
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conducting. The trouble is most of the education programmes are aimed at kids and the only way we're going to know if they're going to be successful or not is when they grow up and start practicing what we've been teaching so there's going to be a bit of a time lapse involved there but that said zoos have been practicing some level of education programme for the last thirty years and that would [INDISTINCT] we must've reached some people out there and yet the status, our environmental status of the plans are just plummeting.

I Ja, isn't it horrific? We're almost done. What are PAAZAB's future plans for Conservation Education?

P We have a very, very active education committee. It's one of our oldest ones...oldest committees and I would hope to see it would maintain its momentum that we started. We've seen a very close link between the PAAZAB committee and the Animal Keepers' Association of Africa to the point now that they're both holding concurrent conferences together, which is a very good sign. I can't say that I've got pressing priorities right now in terms of Conservation Education for the association. That's going to be...that direction will be taken up by the committee themselves. My initial priorities are operational standard and our training of zoo professionals. Once we're further down the line with that then we could start looking at other capacities building which would be along the lines that developing capacity for research and developing capacity for a high level Conservation Education.

I Thank you and the last question. What is your personal opinion about the place of zoos in modern society?

P I would have to say that we've never had a greater need for good zoos.

I But that's good zoos?

P Good zoos.

I Ja.

P Unfortunately as in any field of human endeavour, we've...we have the good and the bad. The good zoos fulfill a pressing need in urban society today, there's no question of that. You look at our attendances of those eleven hundred zoos that I spoke about, our total attendance is eight hundred and seventy million people a year. That's more people than watch soccer games or indeed attend soccer games, so that's our reach. It's not only our reach but it's also vindication of the fact that our zoos, those eleven hundred zoos that I'm talking about, have value. People wouldn't come otherwise.

I Well thank you. That's the end of our interview. You've survived it. Well except for if you want to say anything else?

--- END OF AUDIO ---