STUDENT-TEACHERS' CONCEPTUALISATIONS OF ENVIRONMENT
AND HUMAN-NATURE RELATIONSHIPS

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Abstract

This study presents arguments for a constructivist perspective and qualitative methodologies for environmental education research. Its purpose was to explore student teachers’ pre-instructional perspectives on the environment and environmental education, as well as on the relationship between humans and the natural world. Interviews were conducted with students in a South African teacher education program with mandatory environmental education sessions.

Three data sets consisting of one-on-one interviews were collected. The first set comprised single interviews with ten students in 1992 and the second set involved multiple interviews with nine students and single interviews with three other students in 1993. The third data set comprised single interviews conducted by an independent researcher to elicit students' experiences of the data collection process.

Students' conceptualisations of the environment, including associated beliefs on environmental education, are described within five categories: social, political, biophysical, integrated systems, and part of one's self. Thirteen conceptualisations of human-nature relationships are described, beginning with one portraying the shared origin of humans and nature, then four portraying human-nature connections. The remaining eight are organised on the basis of value which students attributed to the natural world: four conceptualisations relating to intrinsic value, one to inherent value, and three to instrumental value. Students' experiences of the environmental education sessions are also described, drawing attention to themes.

Two conclusions are drawn from the analyses. First, students' pre-instructional beliefs exhibit important elements of conceptions of environment and environmental issues described in the literature. Similarly, their conceptualisations of human-nature relationships traverse a range of eco-philosophical perspectives and include elements of most of the categories developed in this literature. These conclusions are used to argue for the place of eco-philosophical literature within environmental teacher education and for a pedagogical approach which encourages students to explicate and critique their personal beliefs.

Dr. David Bateson
Research supervisor
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CHAPTER 1
Introduction to the study

Overview

Environmental education seeks to promote an awareness of the natural world and is especially concerned with educating pupils about environmental issues and relationships between these issues and human activities (Grieg, Pike & Selby, 1987). Its goal is to bring about changes in human interactions with the natural world. However, it means different things to different educators and diverse practices exist within its “slogan” (Robottom, 1987b, p. 96). These conceptual and practical differences have implications for teachers.

One strategy to promote environmental education within schools is to incorporate environmental perspectives within teacher education, with the aim of enabling student teachers1 to promote these perspectives in their teaching. Insights into students' personal beliefs on environment and human-nature relationships may have important implications for the practice of such programs. Indeed, knowledge of their pre-instructional beliefs could inform the design and conduct of environmental education within teacher education.

While this contention can be supported on theoretical grounds, there are few instances in the literature where authors argue for the relevance of learners' personal beliefs on the environment. One report even counters this, by advising that university teachers:

... should assume virtual environmental ignorance on the part of the general university student unless (which is generally unlikely) their secondary school education has given them an obligatory basic environmental education. (UNESCO-UNEP, 1991, p. 2)

Having been impressed with arguments in science education regarding a constructivist approach to learning, which stress the importance of engaging learners' pre-

1 Hereafter referred to as students.
instructional beliefs, I wished to consider these arguments and their practical implications for environmental education. This study was conceptualised with a constructivist theory of learning in mind, with the intention of exposing to empirical scrutiny the above assumption of students' ignorance and the apparent assumption that their pre-instructional knowledge is not worthy of attention. These assumptions are either explicitly stated (as above) or implicit in the absence of qualitative research in the environmental education literature exploring learners' personal beliefs.

The study proposes that qualitative research methods are well-suited to develop knowledge of students' environmental beliefs. Such research has not been conducted in the general educational community nor within multicultural teacher education classes in South Africa, the location of this study. Using qualitative methods, this study explores student teachers' conceptual diversity in the field of environmental education.

Background

Diverse perspectives have been brought to bear on environmental issues, including socio-cultural critiques (e.g., Roszak, 1973); scientific analyses (e.g., Wilson, 1988); eco-philosophical inquiry (e.g., Devall & Sessions, 1985; Fox, 1990); and combinations thereof, such as Carson's (1962) Silent Spring. Many analysts consider Carson's work to be instrumental in initiating society's awareness (at least in the English-speaking world) of the impact of modern technologies on the natural world. This awareness has given rise to, and is driven by, a variety of popularly based responses which Evernden (1993b, p. 212) collectively refers to as the environmental movement.

The term environmentalist is generally used to describe people who are concerned about the impact of human activities on the natural world. It is useful to think of an environmentalist as "one who experiences a sense of value in nature" and is moved to

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2 Nature is used here interchangeably with 'the natural world' to refer to the "biophysical world in all its rich manifestations" (Dyer & Gunnell, 1993, p. 56), rather than in the more limited sense of wilderness.
assert the reality of that experience to others” (Evernden, 1993a, p. 4). This description raises the question of how environmentalists might conceptualise relationships between themselves (and/or humans) and the natural world. Only recently has a body of literature developed in response to this question (Fox, 1990).

Arguments presented in the eco-philosophical literature both inform and offer insights into environmentalists' personal philosophies. Some environmentalists, for example, value nature in a largely instrumentalist manner while others attach significance to its intrinsic value. In his review of the foundations of environmentalism, Fox (1990) lays out a typology of eco-philosophical approaches concerning human relationships with nature. He distinguishes between value-based approaches and psychologically-based approaches. These different currents of thought have implications for environmental education, since it is promoted by ‘environmentalist-educators’.

The very term 'environment' is interpreted in different ways. A currently popular conception (in North America, at least) equates it with 'wilderness'. However, this conception differs from others advanced in earlier stages of the environmental (and environmental education) movement. Statements emerging from three United Nations' conferences on the environment in the 1970s framed it in social, political, and cultural terms (e.g., UNESCO, 1980). Today, however, a concern for the environment in the northern industrialised democracies focusses largely on the restoration and protection of wilderness; the relationship of social and political practices to these problems has been de-emphasised (DiChiro, 1987). Even labelling problems as ‘environmental’ rather than ‘social’ conveys a view that acid rain and deforestation are somehow separate from social practices. Orr (1992) argues that 'environmental' is an inappropriate label on the grounds that it encourages people to focus on the symptoms of environmental problems, which associate closely with the natural sciences, rather than on underlying causes, which have to do with social characteristics.
Educators such as Orr (1992) argue for a 're-minding' of the social and political roots of environmental issues. These arguments are relevant to the South African situation, where the close association between political practices and environmental issues is particularly evident. Indeed, many environmentalists acknowledge the extent to which legacies of political policies underlie widespread environmental degradation (Hallowes, 1993; Timberlake, 1986). At the 1992 International EarthLife Africa Conference on “What it means to be green in South Africa”, scant reference was made to ‘green issues’ and eco-philosophical thought (Hallowes, 1993; personal observation). Delegates focussed their attention instead on social, political, and economic factors underlying the country's numerous environmental crises. Given the extent of socio-economic discrepancies in South Africa, this is hardly unexpected. In a context of widespread poverty, the political roots of environmental issues are more apparent than might be the case in the northern democracies, where the extent of these discrepancies is not so vast. Thus, in different social and cultural contexts, both within and among nations, environmental issues and their underlying causes may be thought about in significantly different ways. These approaches to thinking about issues can be expected to shape environmental education programs.

A conceptual framework for thinking about different interpretations is one which views environmental issues as “a human creation, a result of the way we use nature and its resources to satisfy our needs and wants” (Fien, 1993, p. 3). In DiChiro's (1987) words:

The environment is what surrounds us, materially and socially. We define it as such by use of our own individual and culturally imposed interpretive categories, and it exists as the environment at the moment we name it and imbue it with meaning. Therefore, the environment is not something that has a reality outside or separate from ourselves and our social milieux. (p. 24)

She argues, further, that environmental problems are:
... social problems, caused by societal practices and structures, and only viewed or socially constructed as problems because of their effects on human individuals and groups (of course, other living things and systems are also affected). (DiChiro, 1987, p. 25)

These arguments are consistent with proposals that environmental problems cannot be understood, let alone addressed, in isolation from social and political values, lifestyle choices, and personal beliefs (Capra, 1982; Devall, 1988; Guha, 1989).

Livingston (in Evernden, 1993a) portrays environmental problems as analogous to the tips of icebergs: they are simply the visible portion of a much larger entity,

... where the submerged mass constitutes the real problem, that domain of unspoken assumptions which legitimates the behaviour which precipitates the state of affairs we designate as 'the environmental crisis'. (p. xii)

Evernden (1993a) proposes that the consideration of environmental problems must begin with the recognition that their source “... lies not without but within, not in industrial effluent but in assumptions so casually held as to be virtually invisible” (p. xii).

Evernden also contends that assumptions embedded in a conception of nature “as object” facilitate a resourcist rhetoric which legitimates exploitation of natural systems in ways which different conceptions, such as “nature as self”, do not (Evernden, 1993b, p. 163). Fowles (1993) argues along similar lines: “... as long as nature is seen as in some way outside us, frontiered and foreign, separate, it is lost both to us and in us” (p. 140; emphasis in original). Much of Capra's (1988; 1982) critiques of human interactions with the natural world stem from a similar view. These arguments stress the importance for environmental education of ways in which people perceive the natural world, and underlie this study's interest in how the natural world is conceptualised or thought about.
These arguments by environmental authors prompt questions about the nature and purpose of environmental education within schools. Should it mainly promote a scientific understanding of environmental problems? This approach has been described as education about the environment (Fien, 1993; Lucas, 1980). Or should environmental education pay more attention to underlying causes such as political, social, and cultural values—a conception of “environmental education as cultural criticism” (Gough, 1990)? Increasingly, environmentalists believe that socio-politico-economic reforms are only part of what is needed: reform is also needed in the way people think about themselves in relation to the natural world.

Situating the study within education research

The existence of conceptual differences within environmental education underscores the rationale for this study. It was proposed with the hypothesis that students who are encouraged to consider environmental education through their teacher education would, like any group of people, conceptualise environment and human-nature relationships in different ways. This hypothesis is consistent with research in other fields of educational inquiry which show that learners bring diverse beliefs and values relating to the program curriculum and which claim that instruction should take these commitments into account to promote meaningful learning (Novak & Gowin, 1984). From an environmental standpoint, such commitments relate to how an individual might think about environment and human-nature relationships—ways in which he or she construes these relationships.

These arguments have implications for both research and pedagogy in environmental teacher education. One implication is that students should attend to their understandings of human-nature relationships, for at least three reasons. First, they should be encouraged to make their beliefs explicit, so that they become available for scrutiny. This process allows students to engage their beliefs in dialogue with instructors and colleagues, and can promote meaningful learning (Novak & Gowin, 1984). Second,
students should be provided opportunities to consider their beliefs in the light of alternatives (Robottom, 1991), such as those developed in the literature. Third, prospective teachers should be informed about their beliefs on human-nature relationships, as these beliefs will likely be communicated within their teaching practice.

Few research efforts in environmental education probe learners' personal beliefs and characterise ways in which they think of themselves in relation to their surroundings, and I am not aware of any which have been conducted within a teacher education context. Such research would most likely involve qualitative methodologies, yet only two research reports published in the previous five years in The Journal of Environmental Education are situated within a qualitative frame. One explanation may stem from the assumption that learners' pre-instructional knowledge is not relevant to the conduct of the program. Another explanation may be that interpretive methodologies lack credibility in comparison to an applied science approach which characterises most environmental education research in North America (Robottom & Hart, 1993). The fact remains: there are very few instances of qualitative research in environmental education, and none which explore student teachers' beliefs on environment and human-nature relationships.

In other branches of educational research, interpretive methodologies receive considerable attention. Research in science education provides strong empirical support for a constructivist theory of learning, as well as rich descriptions of learners' understandings of concepts and natural phenomena associated with science curricula. Further, the adoption of constructivist principles by science educators has had considerable consequences for pedagogy (Baird & Mitchell, 1987). Regarding learners as 'blank slates', or their knowledge as irrelevant, is antithetical from a constructivist standpoint. A contribution of the present study is to consider how these developments in science education may inform research and pedagogy in environmental education.
In sum, the following claims are embedded within this study’s rationale:

- environment and environmental problems are constructed within social contexts and are subject to interpretation by participants;
- considerable heterogeneity is evident in the literature regarding the scope and goals of environmental education;
- interpretations of environment and human-environment relationships are relevant to the pedagogical practice of environmental education; and
- interpretive methodologies and a constructivist epistemology are appropriate frameworks for research in environmental education.

The first three claims are supported in Chapter 2, and the fourth in Chapter 3.

**The purpose of the study and the research questions**

The purpose of the study is to portray conceptualisations of environment, environmental education, and human-nature relationships espoused by students in a South African teacher education program. Two questions were formulated to elicit and explore students' conceptualisations:

1. **What are some qualitatively different ways in which students conceptualise ‘environment’ and ‘environmental education’?**

   The aim of this question is to portray how students conceptualise environment and environmental education, with primary emphasis on the former.

2. **What are some qualitatively different ways in which students conceptualise the relationship of humans to biotic and abiotic components of their environment?**

   The research sought to identify and describe the ways in which students understand relationships between themselves (and/or humans in general) and other forms of life and the natural world.
Research outcomes with respect to these two questions constitute the study's principal knowledge claims. As the study was conducted in the context of a teacher education program which incorporates mandatory environmental sessions, a third question focussed on students' interpretations of their experiences of these sessions:

3. What are some different senses which students make of their environmental education experiences in the teacher education program?

Their different interpretations are considered in association with the outcomes of the first two research questions.

Perspectives on learning

This study is based on a constructivist epistemology, which portrays bodies of knowledge such as the science disciplines as the socially-validated products of human inquiry which continue to be constructed within social contexts (Cherryholmes, 1988; Latour, 1987). Bodies of knowledge comprise values and knowledge claims that are subject to re-negotiation and re-definition and concepts such as 'environment', too, are socially constructed. The environment "is not something that has a reality totally outside or separate from ourselves and our social milieus" (DiChiro, 1987, p. 25). In conceptualising environment, we draw on beliefs and values of the societies within which we are socialised and educated. These beliefs are to varying degrees constructed idiosyncratically, given differences in personal experiences. Hence, one can expect conceptual differences to be evident within a group of people, especially among those from markedly different social contexts.

A constructivist view of learning considers the interaction between concepts in a learner's "conceptual framework" (Driver & Erickson, 1983) and phenomena experienced. Recent interpretive studies have explored students' and pupils' conceptualisations of diverse phenomena; examples in science education include descriptions of conceptualisations of sound (Linder & Erickson, 1989), energy (Solomon, 1983), and sea-
shore environments (Snively, 1986). In the teacher education literature, studies have explored students' understandings of teaching (Hollingsworth, 1989; Pajares, 1992) and classroom practice (Calderhead & Robson, 1991). These studies base their rationale on Ausubel's argument that "the most important single factor influencing learning is what the learner already knows. Ascertain this, and teach him accordingly" (Ausubel, 1968, in Novak & Gowin, 1984, p. 40). Novak and Gowin (1984) argue that:

The primary concept in Ausubel's theory is meaningful learning, as contrasted with rote learning. To learn meaningfully, individuals must choose to relate new knowledge to relevant concepts and propositions they already know. (p. 7; emphasis in original)

Learning occurs as we change the meanings we give to experience, and teaching is a deliberate attempt to change that meaning (Gowin, 1981). Gowin (1981, p. 41) distinguishes behaviour from action by arguing that action is a behaviour with meaning. Much of the rationale for this study derives from the premise that a person's actions, as both a teacher and more generally in terms of interactions with the natural world, are informed (largely, but certainly not entirely) by his or her perspectives. This research explores the content of students' perspectives, i.e., "the thinker's understanding of that which is thought about" (Johansson, Marton & Svensson, 1985, p. 247).

**Location and context of the study**

The study was conducted with students in the teacher education program in the Department of Education at Rhodes University, Grahamstown, South Africa. This 10 month program (February through November) leads to the certification of Higher Diploma in Education (HDE), which is recognised nationally as a qualification to teach at the secondary school level. Between July and November 1992, I was associated with the Department on a part-time basis, and this enabled me to become acquainted with the
research setting. The following year, I was introduced to the 1993 class of students as a “visiting researcher” and remained in that capacity until returning to Canada in early April.

Socio-political features of the South African environment are inextricably intertwined with this study; these should be borne in mind when considering the study's outcomes and the students' responses in the interviews. In a paper on a “black perspective on natural recreation resources”, for example, Magi (1989) argues that ‘blacks’ are “profoundly influenced by spatial inequalities found throughout the South African socio-economic space” (p. 335). The following paragraphs describe this socio-economic space.

The data collection occurred between events of national significance which provide an indication of the extent of social upheaval in the country: I arrived in South Africa in July 1992, at the start of the Mass Action campaign and about the time of the ‘Bisho massacre’ in the Ciskei/Eastern Cape Province, and departed Grahamstown in April 1993, during the work-stoppages and marches mourning the assassination of Communist Party Secretary General Chris Hani. The final interview occurred one week after this assassination which, in hindsight, “plunged South Africa into one of its worst political crises” (Globe and Mail, Toronto, 15 October 1993).

The racially-inequitable nature of South African society has been described as “the most distorted socio-economic structure in the world, polarised by apartheid into black and white, privileged and oppressed” (Turok, 1993, p. 237). For example, 87% of the land is owned by ‘whites’, 80% of the country’s wealth is owned by 5% of the people, 50% of the population live below the poverty line and 40% do not have paid jobs (Turok, 1993)\(^3\). In Grahamstown, during the time of this study, the unemployment figure was set at 85% (Grocott's Mail, Grahamstown, 8 February 1993). In education, some 23% of ‘black’ adults (3.5 million people, 16 years and older) have no schooling, and less than 3% have some post-secondary qualification (The Third Alternative, 1990). Although the political

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\(^3\) While not subscribing to any tenet of racial separatism and while deploring the divisive nature of racial terminology, I follow Khan (1990, p. 12) in using terms such as ‘black’ and ‘white’.
situation has changed dramatically since announcement of the reform initiatives in February 1990 (de Klerk, 1990), at the time of the study 'blacks' had yet to cast a vote for a national representative. Many environmentalists recognise the extent to which legacies of apartheid policies continue to underlie the country's numerous environmental crises (e.g., Cock & Koch, 1991; Hallowes, 1993; Timberlake, 1986; Wilson & Ramphele, 1989).

**Procedures**

Data for the study were derived from a series of semi-structured interviews (Mishler, 1986) with students in the 1992 and 1993 teacher education programs at Rhodes University. Three data sets were collected: one in 1992 (Data Set #1) and two in 1993 (Data Set #s 2 & 3). In 1992, single interviews were conducted by myself with ten students; analysis resulted in an initial framing of categories in relation to the first and second research questions. The purpose of the multiple interviews of the second data set, conducted by myself in 1993, was to explore students' responses in relation to the questions in greater detail and to address the third question. Interviews comprising Data Set #3 were conducted by an independent researcher to provide information on how students experienced the multiple interviews of the second data set.

**Organisation of the thesis**

There are seven chapters in the study. The first three present its theoretical foundations. The second chapter reviews literature pertaining to eco-philosophical thought and environmental education, and argues in support of claims which underlie the study's rationale. Chapter 3 presents a proposal for qualitative research in environmental education, then elaborates on the study's research method and ends with a description of the context of the data collection. Chapters 4, 5, and 6 present outcomes in relation to the three research questions. The final chapter considers these outcomes in relation to the literature and discusses the study's contribution to environmental education.
CHAPTER 2

The environmental movement and environmental education

Introduction

Environmental education focusses on human interactions with the natural world, and one may think of it as being promoted by ‘environmentalist educators’—those who experience a sense of value in nature, are concerned about the extent of human influence, and who act on those beliefs in educational situations. To understand this curriculum initiative, therefore, it is helpful to consider perspectives within the environmental movement. This chapter reviews different perspectives and argues that these have implications for the environmental education of student teachers.

The chapter begins with a discussion of the relevance of inquiry into human-nature relationships to the environmental movement. It reviews a typology of eco-philosophical approaches and considers how conceptions of environmental education may be influenced by these approaches as well as by different educational approaches. Some environmental education programs focus on scientific knowledge about the natural world, some emphasise the importance of providing students with direct experiences in natural settings, and others place priority on problem-solving environmental issues and engaging students in socio-cultural critique. The chapter concludes by discussing some implications of these practical and theoretical approaches for the environmental education of student teachers.

I. Perspectives within the environmental movement

Introduction

Environmental education promotes an awareness of terrestrial, marine, aquatic, and atmospheric systems and is especially concerned with educating people about environmental issues and the relationship between these issues and human activities. It is difficult to present a description of this educational movement which is general enough to
encompass the variety of conceptions described in the literature! In the description above, for example, there is no mention of an action component (doing something in relation to the issue), yet this feature is core to some conceptions. It is one of a “proliferation of educations” which have emerged in the last thirty years, along with peace, development, and human rights education, and the more inclusive global education (Grieg, Pike, & Selby, 1987, p. 6).

These initiatives share much in common in that they all result from, and are driven by, concern for constellations of issues (as reflected in their names), and a desire to influence the educational experiences of pupils in an effort to address the issues. This begs the question: what are environmental issues? Broadly, they concern human impact upon the natural world. On a global scale, the range of issues such as species extinction, deforestation, resource depletion, and pollution, is immense and may have considerable implications for the future of life on earth (Myers, 1984; Wilson, 1988). Some authors distill these problems down to three looming planetary crises (Orr, 1992). First, a food crisis, resulting from massive deterioration of arable farmland through erosion and loss of topsoil, in combination with a yearly rise in world population of some ninety million (Myers, 1984). Second, a looming exhaustion of fossil fuels upon which industrialised nations are so dependent (Capra, 1982). The third is perhaps best symbolised by global climate change, and concerns over-extending the limits of natural systems, for example, the ability of the atmosphere to absorb various gases with imperceptible effect. In short, there is a growing realisation that human influences on natural systems may not be sustainable in the long term, and that changes are required.

As introduced earlier, environmentalists are those who experience a sense of value in nature and act on these thoughts. This sense of value may, for some, derive from a pragmatic and resource-based view of nature, while for others it may derive from beliefs in the intrinsic worth of nature. These conceptual differences have implications for environmental education.
Consider three hypothetical scenarios: a class conducted by a teacher promoting an instrumental perspective of 'wildlife as resources for the benefit of humankind', a class conducted by a teacher encouraging students to develop a “sense of identification” with non-human forms of life (Fox, 1990, p. 249), and a class where the teacher presents excessive resource consumption as a major environmental issue (Guha, 1989). The messages pupils receive will be quite different in each case, even though each scenario describes a form of environmental education.

To understand this diversity, one should bear in mind that environmental education is promoted by educators who derive conceptual insights from numerous fields of knowledge. Biologists, ecologists, geographers, sociologists, and philosophers, among others, inform the perspectives of those who design and implement programs. As with the environmental movement, theoretical perspectives within these disciplines are by no means homogeneous. Within philosophy, for example, Skolimowski (1981) distinguishes eco-philosophy, a body of literature concerned with analyses of environmental issues and perspectives on human-nature relationships.

The eco-philosophical literature addresses conceptions of human-nature relationships which are considered to be root causes of environmental problems. Currents of thought within this literature reflect conceptual differences within the environmental movement, and these have been reviewed in Toward a Transpersonal Ecology: Developing New Foundations For Environmentalism (Fox, 1990). Fox's review receives considerable attention in this study, given its recommendation by prominent environmental authors; Capra, for instance, describes it as an “almost encyclopedic overview of the entire field” of environmentalism (Fox, 1990, back cover).

A typology of environmentalists' perspectives

Fox (1990) presents a typology which distinguishes between value-based and psychologically-based approaches in eco-philosophical inquiry (pp. 149-196). While
most eco-philosophers are primarily concerned with developing theories of value with regard to the non-human world (i.e., the former approach), much of Fox's book develops the latter approach. His typology presents a map of possible ways of theorising about human-nature relationships. Given this study's interest to elicit students' conceptualisations on this topic, the typology provides a framework against which to consider students' responses in the interviews.

Value-based approaches

The argument of a value-based approach regards humans as valuable in and of themselves (i.e., humans have intrinsic value) and the non-human world as valuable for one of two reasons: instrumental value theory (which views the non-human world as of value only insofar as it is instrumental to human ends), and intrinsic value theory (where at least some members or aspects of the non-human world, in addition to humans, are of value in and of themselves). These are reviewed in turn.

Instrumental Value Theory

Fox discusses three types of arguments within instrumental value theory. The first, unrestrained exploitation and expansionism, is characterised by its emphasis on the short-term gain to be had through physical transformation of the non-human world (e.g., farming, mining). It is based on a belief in the abundance of resources and tends to equate resource transformation with economic growth and progress. It also characterises a pervasive way of thinking about the environment which many eco-philosophers argue is a root cause of current environmental problems. Many people believe they are thinking 'environmentally' when they acknowledge the necessity for restraint on this 'free-for-all' approach. This notion of restraint underlies the next category.

An essential component of the second approach, resource conservation and development, is the recognition that unrestrained resource development, particularly of
non-renewable resources, invariably leads to depletion in the long-term. This approach emphasises the maximum utilisation of non-renewable resources and the sustainable yield of renewable resources. Hence, it is a modified version of the first category, but one which considers more long-term human interests.

The third approach, resource preservation, includes many instrumental value arguments which claim that parts of the non-human world should be preserved (i.e., left largely untransformed by human activity). For example, one might argue that indigenous forests in British Columbia should be preserved on the basis of their importance for recreational tourism. A range of criteria underlying instrumental arguments are listed below. To avoid repetition, preface each metaphor with “The non-human world should be preserved on the basis of its importance as a/an . . . ”:

- life-support system (e.g., in providing humans with essential ‘goods and services’);
- early warning system (e.g., in alerting us to environmental deterioration);
- laboratory (e.g., for scientific study);
- silo (e.g., as a stockpile of genetic diversity for various potential uses);
- gymnasium (e.g., for recreation);
- art gallery (e.g., for aesthetic pleasure);
- cathedral (e.g., for spiritual inspiration);
- psychogenetic system (e.g., in aiding human psychological development”). (Fox, 1990, pp. 150-161)

Throughout these metaphors the use (i.e., resource value) of the non-human world by humans is the criterion by which it is valued.
Intrinsic Value Theory

Exclusively instrumentalist values are uncommon in eco-philosophical arguments, and environmental ethicists argue that "the development of . . . an environmental ethic requires that we postulate inherent value in nature" (Regan, 1981, p. 34).

An important concept in environmental ethics is that of moral standing. Living organisms which have moral standing have rights and are owed certain duties (VandeVeer & Pierce, 1986, p. 3). Much debate concerns competing criteria of moral standing. VandeVeer and Pierce (1986, p. 5) list seven criteria: personhood, potential personhood, rationality, linguistic capability, sentience, being alive, and being an integral part of an ecosystem. Fox (1990, pp. 162-184) distills these intrinsic values into three categories:

(i) Ethical sentientism/awareness-based ethics, where the criterion of moral standing is the capacity for sense perception. For example, the nineteenth century English philosopher Bentham argued that "... the question is not 'Can they reason?' nor 'Can they talk?' but 'Can they suffer?' " (Kapleau, 1983, p. 81). In his view, the criterion of moral standing is whether a being can suffer, or experience satisfaction; that is, whether it is sentient.

(ii) Biological/life-based ethics includes the criteria of life (being alive) and ecosystem (preserving ecosystem diversity). It denies that sentience is an appropriate criterion of moral standing and, thus, extends this standing to all living things. A criterion of preserving ecosystem diversity is characterised by Leopold (1949): "a thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise" (p. 224). This maxim extends moral standing beyond humans or animals, thereby avoiding anthropocentrism; the entire biosphere is seen as an interconnected system with moral standing (VandeVeer & Pierce, 1986, p. 71).

(iii) Cosmic purpose ethics include evolutionary and theological arguments about the ultimate ends of evolution, or the nature of God or God's purposes. For example, an individual may consider all or part of the non-human world to have moral standing because
of beliefs or interpretations of scriptures that “reveal it to be identical with, expressive of, part of, created by, valued by, or simply decreed to be so by God” (Fox, 1990, p. 180).

Psychologically-based approaches

A psychologically-based approach to eco-philosophy is based upon an expansive conception of self, one which goes “beyond one’s egoic, biographical, or personal sense of self, to include an identification with other beings and processes” (Fox, 1990, p. 198). The concept of a sense of identification was originally formulated within deep ecology (Naess, 1973) and has been elaborated by other eco-philosophers (e.g., Devall & Sessions, 1985; Drengson, 1991). Fox refers to deep ecology as ‘transpersonal ecology’, and stresses its psychological aspects: “transpersonal ecology has as much to do with ‘ecologising’ transpersonal ecology . . . as it has to do with ‘psychologising’ our ways of approaching eco-philosophical issues” (Fox, 1990, p. 199).

This psychological approach to promoting environmental consciousness is consistent with the proposal that a central problem in human ecology is the relationship of mind to nature (White, 1967). It is concerned with thoughts and deeds, the latter informed not so much from a sense of moral duty, as from an inclination arising from an expansive conception of self. In Naess' words:

... perhaps we should in environmental affairs primarily try to influence people towards beautiful acts. Work on their inclinations rather than morals. Unhappily, the extensive moralising within environmentalism has given the public the false impression that we primarily ask them to sacrifice, to show more responsibility . . . All that can be achieved by altruism—the dutiful, moral consideration of others—can be achieved—and much more—through widening and deepening ourselves. (Naess, 1987, p. 40)
Arguing along similar lines, Metzner (1991) proposes that the concepts and processes "of ‘empathy’ and ‘belongingness’, in relation to the multiple kinds of community we are a part of, could serve as a more adequate basis for ecological consciousness" (p. 152).

This is not a widespread view of how ecological consciousness might be promoted. Indeed, it is one which has yet to permeate the discipline of psychology:

You will search in vain in the texts and journals of any of the major schools of psychology . . . for any theory or research concerning the most basic fact of human existence: the fact of our relationship to the natural world of which we are a part. (Metzner, 1991, p. 147)

Underlying this promotion of ecological consciousness are perspectives on human-nature relationships which differ in significant respects from thinking of the natural world as ‘object’, separate from self, and primarily of instrumental value. Thus, while environmentalists espouse concern for environmental issues, their perspectives are not necessarily shared by other environmentalists, let alone by people at large.

Perspectives, nonetheless, are embedded within the promotion and implementation of environmental programs. This partly explains the diversity of educational programs which go by the name of environmental education: different educators may convey various perspectives in their practice, and different programs may promote different sets of perspectives. The following section enlarges on this conceptual diversity within environmental education.
II. Perspectives within environmental education

Introduction

This section connects the review of theoretical approaches within the environmental movement to perspectives within environmental education. It begins by re-visiting some issues raised by environmentalists, follows with a description of the development of environmental education, and then reviews three emphases of environmental education.

Our awareness of environmental problems—such as diminishing biodiversity and the 'greenhouse effect'—stems from, and is informed by, scientific knowledge. Most environmental education programs promote participants' scientific understanding of such problems and there is widespread agreement that this knowledge is an important component of environmental curricula. However, Naess raises an important issue when he questions the influence of perspectives within science in contributing to the understanding of humans in relation to the natural world. He warns against confusing the instrumental excellence of science with its properties as a philosophical outlook on the human-nature relationship (Evernden, 1985, p. 28). Naess' warning prompts questions about assumptions embedded within scientific conceptions of the natural world that remain unquestioned in many environmental programs.

These 'embedded assumptions' have received attention in the literature in recent years. Authors are especially concerned to analyse and critique worldviews—the "collection of values, beliefs, habits, and norms which form the frame of reference for a collectivity of people" (Devall & Sessions, 1985, p. 43). Devall and Sessions (1985), among others (Capra, 1982; Carson, 1962; Evernden, 1993a; Merchant, 1989; O'Briant, 1974; White, 1967), propose that a mechanistic and objective view of the natural world are deeply rooted in scientific thought and constitute core elements of a currently "dominant modern" worldview (p. 43). Its assumptions have had far-reaching influences on the way in which people conceptualise, hence interact with, the natural world. Mechanistic conceptions of
nature may serve “as a rationale for treating the natural environment as if it consisted of several parts, to be exploited by different interest groups.” (Capra, 1982, p. 40).

These eco-philosophical critiques are being noted by philosophers at large. In a comprehensive review of the history of Western thought, Tarnas (1991) comments upon “the imperative to rethink and reformulate the human relation to nature” (p. 404). Eco-philosophers are engaging in this process. They are, in effect, creating a postmodern ecological worldview which

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\text{... seeks to transcend both modernism in the sense of the worldview that has developed out of the seventeenth century Galilean-Cartesian-Baconian-Newtonian science, and modernity in the sense of the world order that both conditioned and was conditioned by this worldview. (Griffin, 1992, p. ii)}
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These arguments have implications for programs which aim to promote environmental consciousness. Evernden (1985) argues that the sense of separation “which Descartes bequeathed to us may well be the most potent adversary of environmental thought” (p. 54). In contrast, deep ecologists encourage a sense of identification, or connectedness, with other forms of life, calling upon people to “experience themselves as intimately bound up with the world around them” (Fox, 1990, p. 245).

The arguments also prompt questions about the nature and purpose of environmental education. Should it promote an exclusively scientific understanding of environmental problems? Or should it be concerned with deeper causes—such as political behaviour, socio-cultural values, and philosophical arguments?

Historically, calls for environmental education proposed socio-political critique (DiChiro, 1987). Robottom (1991), however, describes environmental education as having been co-opted by the sciences, with the consequence that programs tend to focus—excessively, he argues—on scientific knowledge. More recently, calls have again come for socio-cultural critique, on the argument that we can no longer deal with environmental
issues in isolation from the attitudes and assumptions that precipitated them (Evernden, 1993a). Reform is needed in the way people think of themselves in relation to nature. These authors, in other words, argue that the environmental crisis is a manifestation of a 'crisis of perception'.

In summary, different approaches to environmental education result from different theoretical frameworks which practitioners bring to bear in the formulation and implementation of educational experiences. The following discussion reviews some trends in the historical development of this educational initiative.

The historical development of environmental education

Environmental education—in the sense of teaching and learning about human interaction with the natural environment—can be traced back to ancient civilisations. Theophrastus, a student of Aristotle, argued for a form of integrated environmental management, including education in areas such as resource use and sustained yields (Irwin, 1990). Modern conceptions have roots in the industrialised democracies and in a growing awareness of the effects of human activities on nature. Some publications have been particularly influential in promoting this awareness: Downs (1983) includes Rachael Carson's (1962) *Silent Spring* among the most recent of 27 entries in his *Books That Changed The World*. In his review of the emergence of the environmental movement, Fox (1990) describes the impact of Carson's work:

> The birth of the environmental movement as a vigorous, temporally continuous, geographically widespread, and increasingly well-organised social and political phenomenon is typically dated to the virtual explosion of interest that attended ... *Silent Spring*. Carson indicted modern humanity for its headlong and unthinking rush down the technological 'quick-fix' path of employing synthetic chemicals to control insects. (p. 4)
Fox argues that *Silent Spring* was significant not only for its criticism of the biological damage of synthetic chemicals; it was also an indictment of the manner in which people viewed themselves in relation to the natural world. These views provided the context in which it was permissible to employ poisons on a vast scale. Her critique suggested that an appropriate response lay, not primarily in the application of technical solutions, but in a “thorough rethinking of our most fundamental attitudes concerning our place in the larger scheme of things” (Fox, 1990, p. 5).

Environmental education in the modern sense is a response to this growing awareness, the term itself only having been coined in 1965 (Grieg, Pike & Selby, 1987). The bulk of its development occurred since the 1940s, and especially as a result of the landmark U.N.-sponsored conferences at Stockholm in 1972, Belgrade in 1975, and Tbilisi in 1977 (Robottom, 1987a). Delegates at the Tbilisi conference adopted the Tbilisi ‘definition’ which came to be widely accepted:

> Environmental education is the process of recognising 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. (Robottom, 1987a)

These principles were re-affirmed as guidelines for the development of national programs at the 1987 International Conference on Environmental Education in Moscow (Irwin, 1991). As Robottom (1987b) notes, there are close similarities between the Tbilisi statement and that adopted in the 1975 Belgrade conference. The common elements of these goal statements are:

- improved awareness/knowledge about the environment (a cognitive component),
- an attitude of concern for the environment (an affective component), and
• a problem-solving orientation (an action component involving individual and collective work).

For example, the 1980 International Union for the Conservation of Nature and Natural Resources (IUCN) World Conservation Strategy was specific in its advocacy of an ethic for the environment, involving a behavioural action component:

Ultimately, the behaviour of entire societies towards the biosphere must be transformed if the achievement of conservation objectives is to be assured. A new ethic, embracing plants and animals as well as people is required for human societies to live in harmony with the natural world on which they depend for survival and well-being. The long-term task of environmental education is to foster or reinforce attitudes and behaviour compatible with this new ethic. (Greenall, 1987, p. 17)

Whereas earlier descriptions concentrated on cognitive and affective components, the inclusion of problem-solving has broadened the scope of environmental education, with important consequences. Environmental issues were re-conceptualised as social issues over which opinion is divided. In educational terms, the process of arriving at personal and collective 'solutions' requires an explication of contending values. This approach goes beyond the transmission of scientific knowledge and the inculcation of particular values, to involve an examination of how and why perspectives related to environmental issues have come to exist, and how these perspectives continue to influence those concerned with the issue. It involves ideological critique, where the vested interests of parties and groups associated with the issue, whether directly or indirectly, are made explicit and subjected to critical scrutiny. In the words of a UNESCO (1980) document:

Environmental education should not confine itself to disseminating new knowledge but should help the public to question its misconceptions.
concerning the various problems of the environment and the value-systems of which these ideas are a part. . . All decisions regarding the development of society and the improvement of the lot of individuals are based on consideration, often implicit, concerning what is good, beautiful, and so on. The educated individual should be in a position to ask questions such as: Who took this decision? According to what criteria? With what immediate ends in mind? Have the long term consequences been calculated? In short, he must know what choices have been made and what value system determined them. (UNESCO 1980, p. 27)

Thus, conceptions of environmental education advanced by international bodies have evolved over the last 20 years and continue to do so. While a consistent thread has been the endorsement of scientific explanations of environmental problems, there is increased recognition of the political nature of environmental education. At the heart of issues is the demand humans make on the biosphere. Many issues concern the distribution of energy, food, materials and wastes and, if politics concerns "Who gets what, when, and how?", then the investigation of most issues invariably confronts socio-political questions (Orr, 1992, p. 144). This clearly brings a socially-critical stance to environmental education, a stance which is informed by developments in educational thought, particularly critical theory (Carr & Kemmis, 1987).

An important issue in environmental education concerns its educative aspect: should programs emphasise a relatively uncritical induction of students into existing bodies of knowledge? Or, as critical theorists advocate, should they "be concerned with identifying and exposing those aspects of the existing social order which frustrate the pursuit of rational goals" (Carr & Kemmis, 1987, p. 130)? In other words, should their aim be to reveal "to individuals how their beliefs and attitudes may . . . help to preserve a social order" (Carr & Kemmis, 1987, p. 139)? A critical approach would, for example, involve the identification of those aspects of the dominant worldview which frustrate the goal of
ameliorating or reversing current damage to natural systems (Blackstone, 1974; Devall & Sessions, 1985; Evernden, 1985). Drengson (1991) argues, for example, that the environmental crisis,

... is not a crisis of the environment or nature. In reality, it is a crisis in the structures of character and culture which we have created, and continue to re-create in our daily lives. (p. 132)

A curriculum should encourage exploration of human-nature conceptions, alternatives such as those emerging in the eco-philosophical literature, and their relevance to pupils. That is, it should involve the "pervasive examination of man's relation to nature" (Hart, 1979, p. 15).

While conceptions of environmental education vary from exclusively science-based approaches to broader ones, this does not imply that current programs have adopted an holistic focus. These conceptions are drawn from the literature, not from a survey of extant practices. Nonetheless, Hart (1979) observes that teachers may see environmental education as:

... an expanded version of conservation education; a new version of conservation education; a new version of science education; an expanded version of outdoor education; an enlargement of biology into ecology; a modification of geography into something broader and deeper; an addition to English courses so that they, for example, might include a composition on how we left the picnic area unlittered. (p. 15)

These observations illustrate the claim that environmental education means various things to different advocates and consists of diverse practices. The following section reviews three emphases in environmental education.
Three emphases in environmental education

Lucas (1980) and Robottom (1991, 1990, 1987a) argue for distinctions to be made among three emphases within environmental education: education about, education through (or in), and education for the environment. While a program may incorporate elements of all three, it will likely display a particular emphasis.

Education about the environment

The focus here is on the teaching of knowledge about the natural environment, especially scientific principles, the survival needs of rare species and endangered habitats, human impact on natural systems (terrestrial, marine, aquatic, and atmospheric), and scientific explanations of phenomena (e.g., ozone depletion, greenhouse effects). For a list of concepts advocated as “Essential Learnings in Environmental Education”, see NAAEE (1990). This is probably the most common form of environmental education currently practised, and often amounts to a combination of biology and geography. Robottom (1991, p. 20) refers to this emphasis as the “science perspective”, and Hart (1979, p. 15) as “a new version of science education”. An example of a course with this perspective is the Environmental Systems course of the International Baccalaureate program, which I have experience in teaching. This “experimental sciences” course stresses:

... the objective assessment of the relationships in ecosystems, requiring an empirical approach in which the ‘scientific method’ is adopted. The dominant feature of the course is the study of relationships between components of the environment (which includes humans), by means of a systems approach which emphasises the theme of interdependence. (International Baccalaureate, 1987, p. 3)

Similarly, the emphasis in Environmental Science courses lie in the study of physical and biological environments of organisms (NAAEE, 1990). Lessons about ecological
processes and related bio-physical aspects of environmental issues are education about the environment.

**Education through (or in) the environment**

Environmental education through (or in) the environment (as in the natural outdoors) is essentially experiential and, like education about the environment, has a long history. Goodson (1987) cites *Emile* (published in 1767), in which Rousseau argued that “nature should teach the child, not the classroom teacher with his formal methods” (p. 84). Experiential education is in many ways exemplified by the world-wide Outward Bound programs which advocate learning through experience in adventure-based activities. An official mission statement adopted in 1980 reads:

Outward Bound's purpose is to develop respect for self, care for others, responsibility to the community, and sensitivity to the environment. The O.B. process assumes that learning and understanding take place when people engage in and reflect upon experiences in challenging environments in which they must make choices, take responsible action, acquire new skills, and work with others. O.B. implements its educational and social purposes by providing leadership in experience-based programs. (Miner & Boldt, 1981, p. 348)

These programs operate as a supplement to formal schooling and are primarily concerned with personal, moral, and social development through the provision of challenging outdoor activities. In North America, residential outdoor programs as a component of formal schooling have operated since 1919, although it was only in the late 1940s that the goals of conservation education were incorporated into their activities (Bateson, 1981). In the 1950s these programs evolved into an extension of the school science curriculum as ‘laboratories for learning’ and since 1965, increasing attention has
been given to the scientific elements of ecological and environmental studies, reflecting society's growing concern for environmental issues (Bateson, 1981, p. 4). As with education about the environment, these programs promote environmental awareness.

**Education for the environment**

Education for the environment differs from the previous emphases in that it gives weight to critically examining economic and political processes which shape the social perception and use of nature. It also promotes learners to act on their informed concern for the environment. In Fien's (1991) description, it:

... seeks to promote a willingness and ability amongst learners to adopt lifestyles that are compatible with the socially and ecologically sustainable use of environmental resources. In doing so, it builds upon education in and about the environment to help develop an informed concern and sense of responsibility for the environment through the development of an environmental ethic and the motivation and skills necessary to participate in environmental improvement. (p. 18)

Underlying a socially-critical conception of environmental education is a perspective on environment as that which:

... surrounds us, materially and socially. We define it as such by use of our own individual and culturally imposed interpretive categories, and it exists as the environment at the moment we name it and imbue it with meaning. Therefore, the environment is not something that has a reality outside or separate from ourselves and our social milieu. (DiChiro, 1987, p. 25)
In terms of this conception, environmental problems are more usefully thought of as social/political problems. Orr (1991), questioning the widespread conception of environmental problems as problems of science, proposes a redefinition:

We have defined the problem wrongly as one of science, not one of politics. Accordingly, we have focused on the symptoms and not the causes of biotic impoverishment. (Orr, 1991, p. 11)

An aim of a program with this perspective would be to critique current human-environment interactions, as a necessary step in the development of environmentally-positive interactions (Robottom, 1990). This may involve pupils investigating issues to understand and mount a critique of the arguments, evidence, and value positions pertaining to the issue (Robottom, 1987a). Those advancing this approach recognise the socially-constructed nature of dominant beliefs, such as an instrumental conception of nature (Gough, 1990; Merchant, 1989), and base their arguments on (at least) two points: first, that these beliefs are root causes of current crises and, second, that these beliefs should not be accepted without critical examination in an educational program.

An education for the environment invites socio-cultural criticism. It makes explicit beliefs and assumptions which otherwise would remain implicit and unquestioned. For example, Devall and Sessions (1985) argue that the dominant worldview contains implicit assumptions such as:

... the earth is seen primarily, if not exclusively, as a collection of natural resources. Some resources are infinite; for those that are limited, substitutes can be created by technological society. There is an over-riding faith that human society will survive. Humans will continue to dominate nature because humans are above, superior to or outside the rest of nature. (p. 42)
As with any form of education, education for the environment advances a particular set of values. Importance is attached to involving pupils in the critical appraisal of environmental issues and encouraging them to develop a commitment to act on their values, through the provision of appropriate opportunities (Stevenson, 1987, p. 73).

Concluding discussion

This chapter reviewed the literature in relation to two aspects of environmental education: it drew upon the eco-philosophical literature to review arguments on human-nature relationships, as these arguments offer insights into theoretical positions underlying the promotion of environmental education. Then, three conceptions (emphases) of environmental education were reviewed, to substantiate the claim for conceptual heterogeneity within this initiative. As will be argued in the following discussion, there are important differences among these three conceptions, particularly between the about and the for types. This discussion draws together the portrayal of this conceptual diversity and ends by relating it to the study's purpose.

An important distinction between the three conceptions is that education about the environment is primarily concerned with the reproduction of scientific knowledge. This is not to argue against a role for science in environmental education. Without question, scientific analyses and interpretations of environmental issues enhance our understandings of the effects of human influences on the natural world. Thus, any environmental education program in a school system will invariably incorporate elements of the about approach, such as a review of ecological principles. However, some authors argue that an exclusively scientific approach to environmental education masks root causes of problems, and will likely exclude “radical social alternatives and sustain a technocratic environmentalism which can ameliorate but not solve environmental issues” (Greenall, 1987, p. 13).
Importantly, the for approach encourages students to question why they perceive the world about them in the way they do. Many approaches to outdoor education and environmental education embody a conception of the earth as an object of instrumental value: “its worth determined by its uses to humans as a silo of resources, an archive of our heritage, a laboratory in which to make discoveries, a gymnasium in which to exercise, a recreational amenity, and so on.” (Gough, 1990, p. 12). A key feature of the for approach is that the perspectives embedded in scientific analyses of issues must be questioned.

Take, for example, the issue of clear-cutting in British Columbia's old-growth forests. An educator promoting a science-based resource management perspective might portray this issue in instrumentalist terms of “conservation for sustainable economic development” (Gough, 1990, p. 13). Gough questions whether environmental education in these terms is any more than a palliative for environmental ills. Advocates of education for the environment, on the other hand, propose that, for example, a conception of old growth forest as resources be made problematic and subjected to critical inquiry.

Through becoming aware of the variety of ways in which such natural features may be conceptualised, students become more informed when it comes to justifying their own stance on the issue. For example, some of those who actively oppose the destruction of old growth forests do not perceive these areas as resources alone. As this review indicates, there are different ways of thinking about natural systems. From a deep ecology standpoint, a problem with objective environmental education is that it teaches

... by precept and example that... nature exists as a commodity to be enjoyed and consumed by humans. It teaches there is a technological solution to all problems. (Devall & Sessions, 1985, p. 182)

An environmental education program with a critical perspective would not allow the resource management perspective implicit in an objective science-oriented approach to remain unchallenged. The point is not that scientific interpretations are being rejected; what
is rejected is a situation in which perspectives embedded within science contribute exclusively to students' understandings (Griffin, 1992, p. iv). A scientific perspective is recognised as one among others; an educational program should not ignore alternative perspectives.

In educational terms, the proposal that an educational program should promote a particular perspective on human-nature relationships is problematic. Educational programs teach values both explicitly and implicitly, and the question arises: which values should be promoted? As this review indicates, authors in North America have made a case for the importance of eco-philosophical approaches (c.f., Devall, 1988). However, Guha (1989) questions the appropriateness of eco-philosophy to the Third World, largely because those perspectives have been developed in First World societies. There are few instances in the eco-philosophical literature, for example, which explore perspectives espoused by Africans.

The study builds upon these arguments by proposing that it is not sufficient for students in an environmental education program to critique dominant worldview perspectives alone. A modification of the for conception is also proposed: students should engage their personal beliefs as a first step in the critique of human-nature relationships. Accordingly, the study was designed to explore students' beliefs. How do these beliefs relate to eco-philosophical thought? Should educators promote particular eco-philosophical perspectives, especially in multi-cultural classrooms? The study generates knowledge of students' beliefs to inform a response to these questions.
CHAPTER 3
Research methodology and procedures of the study

Introduction

This study proposes that interpretive methodologies and a constructivist epistemology are appropriate frameworks for research in environmental education. The first section of this chapter supports this proposal, and the second section provides an account of the study's procedures. The following discussion provides a rationale for the inclusion of a third section, an account of students' experiences as participants in the study.

The study's outcomes are based on analyses of semi-structured interviews with students. To inform an understanding of the context in which these interviews occurred, the third section of this chapter presents insights into the students' understandings of their participation in the study. Two reasons justify the inclusion in this chapter of what is, in effect, a side-study of students' experiences of their participation in the research. The first stems from a relational view of conceptualisation—the construct used to frame the study's outcomes—as categories describing 'person-world' understandings, rather than 'purely person' or 'purely world'. From this standpoint, the interviews did not 'get at' views lodged in the students' knowledge structures. During the interviews, rather, the participants, with their individual interests, interacted with myself to create a social situation with particular contextual features, and the resultant text (in this case, transcripts) is a product of that context (Marton, 1988a; Mishler, 1986). To inform an understanding of what was said in the interviews, therefore, it is necessary for the researcher to describe his or her conduct in the interviews. A further step was taken to gain insights into how students understood their participation in the interviews. These insights were gleaned from single interviews, conducted by an independent researcher with students who had participated in the multiple interviews of the second data set, following my departure from South Africa. A second reason for presenting these insights in this chapter is to support the
credibility of the research outcomes which are presented in subsequent chapters. In order to support claims made in the final chapter it is necessary, for example, to establish that students felt free to speak openly and honestly in the interviews.

The first section of this chapter situates the methodological framework of the study within education research at large and environmental education research in particular. Given the paucity of interpretive research in environmental education, an aim of this first section is to lay out an argument for this type of research. Toward this end, different approaches to educational research are described in relation to epistemology, then constructs used to characterise outcomes of interpretive science education research are reviewed. Issues associated with the adoption of a constructivist epistemology—topics deemed worthy of research, importance given to the learner's pre-instructional knowledge, and perspectives on learning and understanding—are considered.

The second section describes the procedures of this study, namely data collection, approach to interviewing, data analyses (including transformations and methods of analysis), and member-checking. Finally, the third section presents outcomes of single interviews conducted by an independent researcher with the 1993 interviewees, to inform one's understanding of how they experienced the study.

I. Toward constructivist research in environmental education

Introduction

Research is disciplined and systematic inquiry (Marcinkowski, 1993; Merriam, 1988), its conduct aimed at developing an argument and a conclusion amounting to a knowledge claim (Roberts, 1982; Lythcott & Duschl, 1990). An historical review of educational research reveals different theories of knowledge (i.e., different epistemological frames) which have been regarded as acceptable within scholarly communities (Garrison & Bentley, 1990). A consequence of this epistemological plurality for the conduct of research
is that knowledge claims may be generated through more than one epistemological frame (Cherryholmes, 1988; Tom & Valli, 1990).

This section presents a perspective on the currently popular applied science approach to environmental education research (Robottom & Hart, 1993; Stevenson, 1993) by reviewing science education research which has explored implications of a constructivist theory of learning. These studies provide strong empirical support for this theory and they also offer rich descriptions of learners' understandings of concepts and phenomena associated with science curriculum. They have used qualitative methodologies and the substantial incorporation of constructivist principles in science education research has had significant consequences for the practices of research and pedagogy.

In environmental education research, however, constructivism receives remarkably little attention: less than five research reports published in the Journal of Environmental Education in the last five years are couched in such terms: see Brody (1990/91), Brody and Koch (1989/90), Lisowski and Disinger (1992). In fact, Wals' (1992) research on young adolescents' perceptions of environmental issues, published in the Australian Journal of Environmental Education, is one of the few studies in environmental education of which I am aware that draws explicitly on constructivist perspectives. Evidently, little value is placed on learners' pre-instructional knowledge of environmental education curricula. As Wals (1992, p. 45) claims, environmental educators have little understanding of students' perceptions of the environment and environmental issues. Moreover, such understandings are deemed to be of little consequence in certain circles of environmental education, as exemplified by the advice to assume “virtual environmental ignorance on the part of the general university student”, offered to university teachers in a United Nations environmental education newsletter (UNESCO-UNEP, 1991, p. 2 - cited in Chapter 1).

All claims arise from underlying theoretical considerations. As will be argued in this section, while the claim for an assumption of students' ignorance may be consistent with a technocratic approach to environmental education which gives priority to scientific
knowledge (Robottom, 1991; Stevenson, 1993), it is inconsistent to the extent of being antithetical with a constructivist perspective on learning. One goal of the study is to falsify this assumption on empirical grounds. As will be argued later in this section and elsewhere in this study, as a normative claim for teaching practice, this assumption is a particularly inappropriate pedagogical premise for environmental education in multicultural settings.

Another issue which this section addresses concerns the extent to which emphasis is placed on the ‘environment’ interest of environmental education, with little regard to educational considerations. On reviewing environmental education research reports, one is often struck by the characteristic of a lack of references to educational literature, and there is an apparent lack of effort to make explicit the theoretical frameworks. Mrazek (1993) and Robottom and Hart (1993) even question whether most researchers in environmental education are aware of the contested nature of epistemology in the wider field of educational research. And Marcinkowski (1993) argues that unless environmental education researchers attend to the educative aspects of their practice, in terms of both epistemology and theory of learning, one is at a loss to evaluate their outcomes.

This problem is less evident in science education, and it would seem that researchers in environmental education could benefit from an increased awareness of research activities in this related field. To this end, this section situates constructivist research within educational research at large, reviews constructs widely used to categorise its outcomes, and considers these outcomes in relation to conceptions of learning and understanding. A research specialisation emphasising content-oriented interpretive research, called phenomenography, is introduced as an example of a non-experimental approach to research congruent with constructivist epistemology. Theoretical perspectives developed by researchers in phenomenography inform this study’s methodology.
An historical perspective on educational research

Research in education is a new field of study when compared to research in the sciences, and Soltis (1984) writes of education researchers desiring to “travel the same royal road” by incorporating epistemological and methodological approaches well-established in the sciences (p. 6). Underlying reasons aside, a positivist-empiricist epistemological framework which dominated the sciences at the turn of the century came to be adopted by and incorporated within educational research. This view of knowledge and its generation holds that knowledge is that which has been proven or confirmed, and which is acquired primarily by evidence of the senses: empiricists understand knowledge as that which has been confirmed through objective observations and logic and accumulated inductively (Nussbaum, 1989). The adoption of a positivist epistemology allowed the social sciences to emulate the natural sciences, especially in the latter’s detachment of the observer from the object of inquiry, in the pursuit of laws by which social systems operate (Tom & Valli, 1990, p. 375). Behaviourist approaches to education research, like the currently popular applied science approach to environmental education, effectively perpetrate this epistemology (Robottom & Hart, 1993, pp. 34-43).

Behaviourist researchers concentrate on manifest, observable behaviours which are readily quantifiable and which allow for statistical analyses and well-defined conclusions that are generalisable. By concentrating on observable changes in behaviour, researchers in education had—what is claimed or assumed to be—an ‘objective’ basis for their research (Gowin, 1981). This claimed objectivism arose from the distinction positivists make between fact and value, where empirical generalisations describe what is, and values determine where one wants to go (Tom & Valli, 1990, p. 375). This perspective allowed for a scientific form of educational research which was expected to produce results, analogous to laws, valid across different contexts. Process-product researchers, for example, attempted to discover through intensive experimentation relationships between specified teacher behaviours (processes) and student outcomes (products) (Gage, 1980).
Consider that while any view of education will point to something that changes as a consequence of an educative event, behaviourist and classical views take the product of the process as logical evidence of the process (Gowin, 1981). In behaviourist terms, “to educate is to cause change in behaviour along pre-specified objectives” (Gowin, 1981, p. 39), for example, “changing learner behaviour through environmental education” (Hungerford & Volk, 1990). A classical view focuses on the product submitted: “one need not know how the process itself works, as long as one has absolutely impeccable standards and reliable expert judges” (Gowin, 1981, p. 39).

An important consequence of behaviourist research is that it tends to ignore the student’s cognitive activity, treating the learning process “as a ‘black box’ and (looking) only at inputs and outputs” (Millar, 1989, p. 587). From a behaviourist standpoint, a student who is thinking actively, while motionless, is not behaving in an educationally relevant manner. Yet, “the most common behaviour found in schools, the listening of pupils, is not directly observable” (Gowin, 1981, p. 38).

Thus, the behaviourist research tradition which flowed from a positivist-empiricist epistemology tended to ignore “the idiosyncratic, covert concept meanings that are the principal factors in most human learning” (Novak & Gowin, 1984, p. 158). Conversely, Gowin (1981) proposes a view of learning as a change in the meaning of human experience. Implications for education research which flow from the adoption of this view involve some form of exploration of cognition which, broadly, deals with the acquisition, retention, and manipulation of meanings (Pines, 1985, p. 115). Novak and Gowin (1984) claim that “the most significant aspect of human behaviour is our ability to form concepts, to label concepts with language symbols, and to manipulate these symbols” (p. 154). Underlying these markedly different views of educationally-relevant behaviour are different views of knowledge itself.

Posner, Strike, Hewson, and Gerzog (1982) acknowledge postpositivist philosophy of science to be a major source of their perspectives on learning as conceptual
change. Note that the acknowledgement of an alternate and valid theoretical framework is contingent upon a departure from a purely positivist standpoint. This departure was bolstered by Kuhn (1970) and Lakatos (1970) in their critiques of traditional scientific epistemology. While Kuhn and Lakatos were concerned with the status and nature of scientific knowledge, their analyses relate to the nature of knowledge per se, hence to how knowledge in general is created or constructed. There are at least two levels at which this knowledge construction can be understood and studied: at a personal level (as in an individual learning, or coming to know), and at a social level. Merchant's (1980) research, on how societies have conceptualised nature and human-nature relationships through historical time, exemplifies the latter. In the present study, by comparison, the research interest lies with students' personal knowledge at a point in time. This interest was prompted by approaches to science education research which explore how learners conceptualise phenomena associated with science curriculum.

Two important points emerge from this overview. First, research methodologies and associated knowledge claims are seen as consequences of epistemological stances and views about learning adopted by researchers. This helps to explain how research questions arising from a behaviourist theoretical framework differ from those arising out of a theoretical framework that stresses the importance of cognition. Second, behaviourist research effectively ignores conceptual or cognitive activity. That the study of such activity is now a focus of science education research makes this omission in the environmental education literature all the more noticeable. Many current research endeavours in science education are framed within a constructivist epistemology. This frame would seem to be particularly appropriate for research in environmental education, given widespread agreement that environmental education entails addressing students' attitudes and beliefs concerning extremely complex issues which are heavily value-laden and for which there are often no 'right' answers. A description of this theoretical frame follows.
Constructivist epistemology

A constructivist theory of knowledge asserts two principles:

(1) knowledge is not passively received but is actively built up by the cognising subject; and (2) the function of cognition is adaptive and serves the organisation of the experiential world, not the discovery of ontological reality. (von Glasersfeld, 1987, p. 132)

Constructivist epistemology has consequences for the study of learning as well as for the practice of teaching, even if the first principle alone is accepted (which von Glasersfeld terms trivial constructivism). In line with the first principle, much research in science education explores the manner in which pupils interpret material presented to them in classroom instruction (Millar, 1989), incorporating their own previous experiences and knowledge. For example, Linn (1987) states that:

Jean Piaget's classic studies of children's conceptions of the world have influenced educators to respect the learner as one who actively constructs a coherent world view and who seeks persistently to integrate formal and informal learning experiences. (p. 192)

This view of learning contrasts with behaviourist interpretations of teaching and learning which effectively promote a passive view of the mind where learners accumulate knowledge provided by the teacher (Gilbert & Watts, 1983). Constructivist-based studies provide strong empirical support to counter this 'blank slate' perspective of the learner and of learning. Learning, rather, is considered to involve an interaction between meaningful concepts in the learner's "conceptual framework" (Driver & Erickson, 1983) or "appreciative system" (Schon, 1987). An example of research undertaken with this perspective is Snively's study on childrens' conceptualisations of the seashore environment (Snively, 1986). As she argued, because:
students have experienced and thought about the world, they enter learning situations with a complex cluster of ideas, beliefs, values, and emotions, . . . and it is the potential match between these existing cognitive commitments and the new information which determines how the student will respond to the instructional inputs. (Snively, 1986, p. 20)

Concerning von Glasersfeld's (1987) second principle, in contrast to positivist epistemology, constructivist epistemology rejects the notion of an objective ‘base’ of observations against which our theories of the world can be checked:

. . . science as public knowledge is not so much a discovery as a carefully checked ‘construction’. In our attempts to represent the world, we construct theoretical entities (magnetic fields, genes, orbitals) which in turn take on a ‘reality’. (Driver, 1987, p. 6)

Use of the term ‘construct’ emphasises the stance that these categories exist in our thinking because they have been constructed (i.e., delimited, framed in meaning) as discrete entities by researchers attempting to make sense of, for example, students' understandings of phenomena. Thus, a construct is “an intellectual device by means of which one construes events. It is a means of organising experience into categories” (Cronbach, 1971, in Cherryholmes, 1988, p. 99). Bateson (1979) makes an important point that “the division of the perceived universes into parts . . . is convenient and may be necessary, but no necessity determines how it shall be done” (p. 38; emphasis added). This post-positivist observation should be borne in mind as one considers any category. For example:

Naming is not just a matter of labelling distinctions that are already thought to exist. . . . In creating these distinctions, humans can all too easily lose
sight of the seamlessness of that which is signified by their words and abstractions. (Gough, 1990, p. 17)

In terms of a constructivist epistemology, we interpret our reality through symbolic conceptual systems (Pines, 1985, p. 111). Our world is perceived through “conceptual filters”, and sensation—the “raw data of the senses”—is transformed through conceptualisation into perception (Pines, 1985, p. 110). Thus, our knowledge of the world comes into being only in and through interpretations:

the subject of knowledge is already embedded in the object of knowledge: the human mind never stands outside the world . . . every object of knowledge is already part of a preinterpreted context ”. (Tarnas, 1991, p. 397).

Reality, in this sense, is interpreted by the mind, not simply perceived by it. Hence, all research, being a result of human purposes and based upon theoretical constructions, is unavoidably interpretive (Garrison, 1986; Howe & Eisenhart, 1990). Concerning the present study, in the process of conceptualising ‘the environment’, we inevitably make value judgements about ‘it’. This human evaluation of ‘the environment’ depends upon the differing circumstances (social, political, economic) in which we find ourselves (Dyer & Gunnell, 1993, p. 61). These variables, in turn, differ markedly across social contexts.

Other postpositivist perspectives on research in the social sciences include critical theory (Carr & Kemmis, 1986), and/or critically-oriented research (Tom & Valli, 1990), and/or critically-reflective inquiry (Hart, 1993). Research frameworks may be characterised in terms of their positions on values: value-neutral (positivism), value-relative (interpretivism) and value-centred (critically-oriented) (Robottom & Hart, 1993; Tom & Valli, 1990). Critically-oriented research emerged from the interpretive tradition, with theorists arguing that while interpretive methods provide knowledge which promotes understanding and meaningful dialogue, alone they are insufficient because they exclude
questioning the content of such understanding (Carr & Kemmis, 1986, p. 137).
Critically-oriented research, with an explicit commitment to social justice is, therefore,
explicitly value-centred. Drawing on Schwab’s distinction of technical (instrumental, pre­
supposition of given ends) and practical (no assumption of given ends) purposes of
educational research, Kemmis (1988, in Hart, 1993) considers that critical social scientific
research

... employs a practical form of reasoning (like that of interpretive research)
which at the same time is critical: it is shaped by the emancipatory intent to
transform educational practices through, ultimately, ideology critique. (p. 110)

**Qualitative science education research**

Whereas positivist research aims to explain (erklären) through laws, postpositivist
qualitative research aims to elicit personal understanding (verstehen) (Gilbert & Watts,
1983). In qualitative approaches to research a paramount objective is to understand the
meaning of an experience (Merriam, 1988, p. 16). Lythcott and Duschl (1990, p. 447)
and Marton (1988a, p. 181) refer to interview studies as qualitative research, as they aim
to characterise the kind of beliefs that people espouse (L. qualitas—“of what kind”).
Because the investigator is understood to be the “primary instrument for gathering and
analysing data”, this approach to research is explicitly interpretive (Howe & Eisenhart,
1990; Tom & Valli, 1990, p. 375). There is explicit recognition that all observations and
analyses are filtered through the researcher’s worldview, values, and perspectives
(Merriam, 1988). Hence, interpretive research involves the explication of something
through the eyes of another; for example, the exploration of an individual’s conceptual
understanding by careful analysis of their explanations (Linder, 1989).

While quantitative methods are applicable within a post-positivist epistemology,
much research in science education has used qualitative methods. Research eliciting
students' personal understandings of scientific principles and natural phenomena builds on earlier work by Piaget and Ausubel (Driver, 1989; Linn, 1987; Millar, 1989).

Views of cognitive construction were elaborated by Piaget in the first half of this century and his pioneering use of relatively unstructured interviews was a significant methodological contribution (von Glasersfeld, 1989; Lythcott & Duschl, 1990). Piaget also introduced the terms assimilation and accommodation, to distinguish learning that is incorporated into prior knowledge (assimilation) and learning that fundamentally modifies prior knowledge (accommodation) (Garrison & Bentley, 1990). These terms are used in more recent accounts of learning (Hewson, Zeichner, Tabachnick, Blomker & Toolin, 1992; Posner et al., 1982).

From a behaviourist stance, Piaget was criticised for speculating on the inner workings of the mind (Novak & Gowin, 1984). While he attempted to establish generalisable stages of development, recent researchers place more emphasis on "the conceptual frameworks of children's thinking as opposed to the logical structures of their thought" (Driver & Easley, 1978, p. 64). In a review of studies in science education, Driver and Erickson (1983) distinguish between studies which attempt to identify content-independent forms of thought or operative knowledge, and those which focus on individuals' knowledge about specific content domains. Recent research in this field, "in as far as it views learners as architects of their own learning through a process of equilibration between knowledge schemes and new experiences" (Driver, 1989, p. 482), derives much from the Piagetian school (Linn, 1987; Millar, 1989).

Similarly, Novak (1985) states that, "since 1964, our research programme has been based on the cognitive learning theory of David Ausubel" (p. 190). The primary concept in Ausubel's theory is meaningful learning, as contrasted with rote learning (Novak & Gowin, 1984, p. 7). To learn meaningfully, individuals (must choose to) relate new knowledge to relevant concepts and propositions they already know. The contention that young children, for example, 'already know' as they enter formal education, is core to this
view of learning, and is justified on empirical grounds (e.g., Driver, 1989). In Gowin's (1981) words:

... educating these individuals will, from now on, be re-educating:
reconstructing what they already know and value into new patterns. Formal schooling begins in midstream. (p. 23)

These arguments justify interview-based research which seek to characterise students' knowledge, especially knowledge which students bring to instructional settings.

'Conceptions' research in science education

Because students have experienced and thought about the world, they enter schooling with a complex cluster of ideas, beliefs, values, and emotions which they use to understand the world (Snively, 1986). These ideas, beliefs, values, and emotions serve as a conceptual ‘filter’, by which they (along with all other humans) interpret sensory impressions. Authors describe learners incorporating, integrating, assimilating, and accommodating scientific interpretations into this existing knowledge (Posner et al., 1982; Solomon, 1988), a view which is incompatible with the notion of the learner as “tabula rasa” (Driver, 1981, p. 93).

A goal of qualitative science education research has been to probe this knowledge and make it explicit so that it can be characterised. Many researchers base their research studies on Ausubel's statement that “the most important single factor influencing learning is what the learner already knows. Ascertain this and teach him accordingly” (Ausubel, 1968, in Novak & Gowin, 1984, p. 40). Such research promises to improve educational practice by informing teachers' appreciation of how students understand the phenomenon under consideration. Indeed, an important implication of this perspective for instruction is that both teachers and students should attempt to probe these understandings: teachers, so
that they might better relate to each student's understandings, and students, that they might take a more active role in their own learning.

Constructs used to categorise outcomes of research

Science education is not about developing personal theories about phenomena (Millar, 1989, p. 592); it is about coming to share in consensually-held theories, or, being "initiated into the 'ways of seeing' which have been established and found to be fruitful by the scientific community" (Driver, 1989, p. 482). Many studies characterise students' understandings as a means to enhancing the learning of scientific knowledge, rather than, for example, assisting students to develop their own interpretations. These studies use scientific explanations as reference points, hence the use of descriptors such as 'misconceptions' or 'alternative conceptions' (Clement et al., 1989; Hewson et al., 1992). Both refer to a student's ideas that are incompatible with currently accepted scientific knowledge (Rowell, Dawson & Lyndon, 1989).

Introducing even a trivial constructivist perspective (von Glasersfeld, 1987) to science teaching can improve pedagogy, as teachers are more likely to correct students' misconceptions through challenging them in a manner which is meaningful to the student (Hewson et al., 1992; Millar, 1989). Underlying research in conceptual change is the explicit intent to achieve these ends (e.g., Hewson et al., 1992; Posner et al., 1982). A point of departure between science and environmental education concerns the extent to which scientific explanations should function as reference points in environmental education programs (Robottom, 1991), and with respect to emerging eco-philosophical perspectives (Robottom & Hart, 1993). There is debate, for example, on which eco-philosophical perspectives should be promoted (e.g., Dyer & Gunnell, 1993), if at all (Guha, 1989). This issue is revisited later in the study.

Students' understandings of phenomena commonly studied in science classrooms, as well as their interpretations of scientific principles, have been explored in many domains
Various terms have been used to portray these outcomes. These include concept, conception, conceptualisation, and versions thereof: misconceptions, alternate conceptions, preconceptions, prior conceptions, naive conceptions, anchoring conceptions, phenomenological primitives, and commonsense understandings (Clement, Brown & Zietsman, 1989; diSessa, 1983; Driver, 1989; Hills, 1989; Johansson, Marton, & Svensson, 1985). All of these refer to ideas individuals develop about natural phenomena (Driver, 1987). Concept, conception, and conceptualisation are variously used as heuristic devices to characterise qualitatively different understandings, while avoiding judgemental implications. I contend their usefulness will be enhanced if distinctions are drawn between them, as follows.

(a) **Concept.** Silver (1983) refers to a concept as a mental device for interpreting a unit in the stream of sensations we experience. A concept:

... is a kernel of an idea, the smallest unit of analysis in the thought process. Concepts allow us to differentiate one event or sensation from another in the steady flow of events and sensations that constantly impinge on us. (Silver, 1983, p. 5)

Pines' (1985, p. 108) description is similar: each concept is a human invention, a way of “slicing up” and organising the world. Concepts are “packages of meaning”. Once labelled, they become communicable through language. While this meaning can be artificially restricted by stipulating a definition, as is done in science, Pines cautions against the notion that concepts are single units and notes that concepts may have different meanings in different contexts.

White and Gunstone (1989) describe two different uses of concept. On the one hand, it refers to the recognition of members of a class, as a skill, in the same sense as Silver's (1983) meaning. One either has the concept of a test-tube, in which case one
identifies objects correctly as test tubes or as not test tubes, or one does not have any information in one's memory about it. On the other hand, concept has been used to refer to all the knowledge a person has about a term. Elements of this knowledge may include propositions, images, and episodes, together with the skill of recognising test tubes and the motor skills of using them in various ways (White & Gunstone, 1989). However, this second interpretation of concept (all the knowledge a person has about a term) aggregates a useful distinction between concept and conceptualisation.

(b) Conception. The meanings some authors convey through the use of conception overlap with that conveyed by concept. Court (1988) distinguishes between these two constructs by arguing that a concept refers to a publicly-held set of rules or norms governing the use of a term, while a conception is an individual's more idiosyncratic interpretation of a concept or cluster of concepts, that is, an individual's idiosyncratic conception of a concept (Driver, 1987). Conception, however, can also be used to reflect how concepts are understood in a public setting, in contrast to a conceptualisation which refers to a personal understanding. For example, a conception of education for the environment is a socially-mediated form (embodied, for instance, in academic publications), with a set of intended meanings which are discernibly different from conceptions such as education about, or through the environment (Lucas, 1980; Fien, 1993). In the science education literature, this distinction is made by some (Marton, 1988a; Linder & Erickson, 1989), but not by most researchers.

Johansson et al. (1985, p. 236) describe a conception as a category of interpretation by which we understand the world around us. A conception in their terms is a qualitative relationship between an individual and some phenomenon, by means of which an individual apprehends and interprets that phenomenon. In contrast, Clandinin (1986), Linder and Erickson, (1989), and Marton (1988a) use conceptualisation to convey these meanings.
(c) Conceptualisation. Conscious meaning is achieved through conceptualisation, the creation and/or adoption and preservation of symbolic meaning (Pines, 1985). In this sense, conceptualisation is used as a verb that describes a process undertaken by an individual within a social context. It is also used in a descriptive manner "to reflect how someone visualises, thinks about, understands, or makes sense of experiences and phenomena" (Linder, 1989, p. 16; emphasis added). A conceptualisation is "always the experience of something, so the description has to be made in terms of the experienced content" (Marton, 1988a, p. 181). Linder makes the point that conceptualisations, as research outcomes, are not meant to represent structures in a person's mind; rather, being qualitative descriptions of person-world relationships, they are characterisations of the content of people's explanations.

In a study of university physics graduates' conceptualisations of sound, Linder (1989) found that students espoused an array of qualitatively different conceptualisations when espousing their interpretations in different interview contexts. He presented these results in terms of "conceptual dispersion" and proposed that aspects of the interview context, such as a pedagogical focus in one interview (with the student playing the role of a tutor), pre-disposed the student to evoke a "physics-world" conceptualisation, in contrast to other situations where "life-world" conceptualisations were evoked. Presumably, these initial life-world conceptualisations were not replaced or reconceptualised in the learning process. Linder (1989) interpreted these students' learning in terms of a metaphorical layering of physics-world conceptualisations over earlier developed "intuitive primary life-world structures" (p.163). Rather than attempt to re-form these beliefs, he argued that science education should encourage students to be able to distinguish between their conceptualisations and, where functionally appropriate, espouse particular conceptualisations. Thus, students would learn to both recognise and rationalise their conceptual dispersion (Linder, 1989, p. 165). An example which springs to mind is of two people in a social context, such as a pub, requesting someone to shut the door to 'keep
the cold out’. In the context of a science classroom discussion about the nature of heat, this conceptualisation would be inappropriate, yet in the context of a pub it would ‘make sense’ to those present and, hence, be appropriate. This example communicates the relational character of a conceptualisation: ‘person-world’, as opposed to ‘purely person’ (Johansson et al., 1985; Marton, 1988a; 1988b).

This interactional perspective on knowledge is adopted in this study. Scientific knowledge, from this standpoint, does not simply describe and explain nature. It is “part of the interplay between nature and ourselves” (Heisenberg, in Capra, 1988, p. 149). As Capra illustrates, the sweetness we taste in sugar is “neither a property of the sugar nor a property of ourselves”. We produce the experience of sweetness “in the process of interacting with the sugar” (p. 149).

A relational view of conceptualisation has consequences for the interpretation of research outcomes derived from multiple methods. Yin (1989, p. 97) argues that the most important advantage of using multiple sources of evidence is the development of converging lines of inquiry, resulting in a process of triangulation. However, an alternative conception of triangulation has been suggested:

\[ \ldots \] the value of triangulation is not as a technological solution to a data collection and analysis problem, it is a technique which provides more and better evidence from which researchers can construct meaningful propositions about the world. (Mathison, 1988, p. 15)

This description places the onus on the researcher to make plausible interpretations, using evidence from different contexts. Indeed, in interpretive studies it is quite possible that close convergence of results obtained in different interview contexts is exceptional, rather than to be expected. This is because different interview contexts may prompt or elicit different conceptualisations (Linder, 1989). From the standpoint of ‘triangulation as convergence’, conceptualisations concerning a specific phenomenon ‘exist’ (as in a
relatively fixed structure in a person's head) to be espoused in most, if not all, cases concerning the phenomenon. From an alternative standpoint of ‘multiple methods as divergence enhancers’, conceptualisations are constructed from a person's response to a specific question and it is quite possible, even likely, that they will vary across interview contexts. Thus, unlike the conception of conceptualisation as relatively stable and context-independent, this relational view of conceptualisation allows for an explanation of conceptual dispersion.

Exploring learners' understandings is often tied to a conceptual change view of learning (Bell, 1993; Hewson et al., 1992; Johansson et al. 1985; Tobin, 1992). In Tobin's terms, “conceptual change is learning, which is a social process of making sense of experience in terms of extant knowledge” (Tobin, 1992, p. 2). Thus, interpretive research which explores learner's conceptualisations is consistent with conceptual change views of learning, and with postpositivist epistemological interpretations of knowledge in general. In contrast, empiricist epistemology provides no reason to consider a student's conceptualisations as relevant to learning (Strike & Posner, 1985). In studies which probe understanding, researchers should attempt to clarify what is meant by ‘understanding’, and in particular, which aspects of understanding emerge as a result of the methods which they employ. As the following review indicates, there is an association between methods used in interpretive studies and the characterisation of students' understandings which are their outcomes.

Exploring students' understandings

Studies which explore students' understandings generally employ modifications of the classical interview technique (Gunstone, White, & Fensham, 1988). Critical in these interviews is the need for the researcher to allow the interviewee as much freedom of expression as possible (Lythcott & Duschl, 1990). Recommendations to guide
interviewers are reviewed by Lythcott and Duschl (1990) and MacDonald and Sanger (1982). For example:

Creating the conditions in which the interviewee says what he or she means, means what he or she says, says what he or she thinks, and thinks about what he or she says, are the major tasks of the interviewer. (MacDonald & Sanger, 1982, p. 181)

Sutton (1980), White and Gunstone (1992), and Brumby (1984) review methods to probe understandings and Driver and Erickson (1983) distinguish between them on a conceptual-phenomenological basis. Studies with a conceptual emphasis draw entirely on linguistic data (e.g., word association tasks) for eliciting students' propositional knowledge. However, this has the limitation of eliciting complex ideas without necessarily illuminating the student's understanding of actual phenomena. An observational method, on the other hand, places more emphasis on context and results in inferred interpretations of the students' knowledge-in-action as some task is performed. In drawing this distinction, Driver and Erickson (1983) emphasise the association between methods employed within interpretive studies and resultant knowledge claims. In effect, they call for careful analyses of outcomes of interpretive studies in general, paying more attention to methods used.

White and Gunstone (1992) elaborate on a conception of understanding, by considering it in relation to six elements of memory:

(1) Propositions, such as facts, opinions, or beliefs;
(2) Strings, which are fixed in form, such as proverbs and poems;
(3) Images, the mental representations of sensory perceptions which are often visual but can be related to any of the senses;
(4) Episodes, which are memories of events;
(5) Intellectual skills, which are capacities to carry out classes of tasks; in effect, these are memories of procedures;

(6) Motor skills, which are capacities to perform physical classes of tasks, rather than mental tasks; and finally,

(7) a more general type of knowledge, Cognitive strategies, which includes broad context-independent skills used in thinking and learning (e.g., deducing and inducing, and maintaining attention to the task at hand).

The conception of an understanding of ‘democracy’ which results from this analysis is that it:

\[ \ldots \text{is the set of propositions, strings, images, episodes, and intellectual and motor skills that the person associates with the label ‘democracy’}. \] The richer this set, the better its separate elements are linked with each other, and the clearer each element is formulated, then the greater the understanding. (White & Gunstone, 1992, p. 5)

Everyone understands to some degree anything they know something about. Understanding of a concept is not a dichotomous state but is a continuum, and a valid measure of understanding of a concept should:

\[ \ldots \text{involve eliciting the full set of elements a person has in memory about it. Also, assessment of the elicited set is subjective, as it depends on the weights the assessor gives to particular elements}. \] (White & Gunstone, 1992, p. 6)

Returning to studies in science education, Driver and Erickson (1983, p. 40) advocated “research endeavours which will uncover student frameworks, investigate the ways they interact with instructional experiences and utilise this knowledge in the development of teaching programs”. A sense of the purpose of studies within this field can be conveyed by envisioning a trend from studies exploring the ‘organisation of thinking’
(i.e., those emphasising cognitive science interests) to those stressing the exploration of qualitatively different meanings of an individual's explanations. While the former aim to describe generalisable features of cognitive representation within a formist theoretical framework (Roberts, 1982), the latter are content-oriented and contextualist (i.e., focussing on an individual's understanding in context). A research specialisation which focuses on qualitative aspects of students' knowledge in particular content domains is called phenomenography: a “family of content-centred domains” (Johansson, et al., 1985, p. 255). Elements of this research specialisation inform this study's methodology and are reviewed in the following section.

Elements of phenomenography

Marton (1988a; 1988b; 1984), Johansson et al. (1985) and Walsh, Dall'Alba, Bowden, Martin, Marton, Masters, Ramsden and Stephanou (1993) advocate research which emphasises the description of thinking in terms of its content. By content, they refer “to the thinker's understanding of that which is thought about” (Johansson et al., 1985, p. 247). The relational perspective between thinker and “that which is thought about” is a distinctive feature of phenomenography. In Marton's words:

The point of departure is an assumption that psychology in the future has to go beyond the single individual and as one of its main tasks, will involve the analysis and description of the distinctively different ways in which human beings relate themselves to various aspects of their world. (Marton, 1984, p. 45)

Phenomenography is “about the qualitatively different ways in which people experience or think about various phenomena” (Marton, 1988a:179). Marton stresses that the area of interest is:
neither about the phenomena that are experienced, or thought about as such, nor about the human beings who are doing the experiencing or thinking. Phenomenography is about the relations between human beings and the world around them. (Marton, 1988a, p. 179; emphasis added)

Conceptualisations of various aspects of the physical world are such relations, as are ideas about democracy, health, and romantic love (Marton, 1984, p. 45). These relations are "between what is perceived, conceptualised, thought about and the one who is perceiving, conceptualising, thinking" (Marton, 1984, p. 45). This relational interest is consistent with the relational description of environment adopted earlier: environment is viewed in terms of conceptual interactions between a person's surroundings and his or her conceptual frames.

A key construct in phenomenography is conceptualisation. Because one always understands some thing (a physical phenomenon or more abstract concepts such as political power, concept of number), a conceptualisation is necessarily a description of experienced content. It is a qualitative description of a person-world relationship. In Marton's (1986) words, "we try to describe an aspect of the world as it appears to the individual" (p. 33). In empirical studies, researchers have found variation in conceptualisations of the same phenomenon not only between but also within individuals (Linder, 1989; Marton, 1984). Thus, one may think of an abstract pool of conceptualisations, within which an individual may move—more or less freely—back and forth (Marton, 1984). These variations in the content of how phenomena may be thought about are explained in terms of the relational nature of conceptualisation and of the mediating influence of context upon this relationship. Depending on the context, an individual may exhibit qualitatively different conceptualisations of the very same phenomenon. Hence, when considering the outcomes of interpretive research, one must have an understanding of the context in which that research was conducted.

The outcomes of phenomenographic research are descriptive categories which the researcher frames in the attempt to communicate an interviewee's understandings. These
categories of description together form the “outcome space”, which Marton describes as a concept “referring to a set of possibilities” (Marton, 1988a, p. 188). That is, the outcome space is a set of qualitatively different ways in which that phenomenon may be thought about. Far from being a ready-made instrument, such as a set of categories in which to situate interviewees' responses, these descriptive categories constitute the research outcomes. Evidence suggests this outcome space—with respect to the particular concept or phenomenon under study—to be finite:

When we ask people about their experience or conceptualisation of various phenomena in the world around them, whether or not these phenomena have been objects of educational experience, again and again we find a limited number of qualitatively different ways in which the phenomena or aspects are seen or apprehended. (Marton, 1988a, p. 189)

Marton (1988a, p. 183) distinguishes between the origin of categories of description, “a form of discovery”—and, I would add, interpretation and invention—and their applicability once described: “it should be possible to reach a high degree of intersubjective agreement concerning their presence or absence if other researchers are able to use them” (Marton, 1988b, p. 8). These studies sample conceptualisations, not people; the purpose is to explore qualitatively different meanings individuals interpret through experiences, and in particular contexts, rather than the prevalence of particular conceptualisations. Once described, they may be ‘lifted out’ of the context where they were found to provide insights into how people might think about those concepts in different situations (Johannson et al., 1985, p. 250).

Phenomenography lies at a current terminus of a trend within education research. From behaviourism's initial disregard for researching cognitive activity, through the interest to explore content-independent mental operations, phenomenography emphasises the centrality of a person's conceptual relationship with that content. Its overall aim is to
map "the hidden world of thoughts about various aspects of the world around us" (Marton, 1988a, p. 180); that is, to draw together outcomes of content-oriented research to establish a phenomenography of each discipline. This would amount to a systematisation of knowledge about the different ways in which people understand and conceptualise phenomena relevant to that discipline (Johansson et al., 1985).

One immediate application of such an endeavour is that it would enable teachers to gain empathetic insights into their students' understandings (Linder, 1989). It also has the potential to unify a large number of existing interpretive-descriptive studies within a coherent theoretical framework. This framework would be based on a view of learning as a transition from one way of thinking to another and qualitatively better one (Marton, 1988b). Although making no reference to phenomenography, Hills (1989) observes that:

... we possess little in the way of an explicit and systematic appreciation of the content of the concepts, beliefs, and so on, (pupils) bring with them to their initial encounters with science instruction. (p.183)

Wals (1992) makes essentially the same argument with respect to environmental education.

Concluding Remarks

This section began by describing the contested nature of epistemology within education, and argued for an increased explication of theoretical frameworks in environmental education research. Its development was prompted by an unease with perspectives embodied in a currently widespread behaviourist approach to environmental education research. Some shortcomings of this approach were considered, and these are elaborated in Robottom and Hart (1993) and Stevenson (1993).

Given fruitful outcomes of research in science education that stemmed from a constructivist perspective, the adoption of this epistemology in environmental education research was proposed. In terms of this epistemology, a key term in environmental
education, namely ‘environment’, is not something that has a reality separate from ourselves and our social milieus. Environmental problems are socially constructed, in terms of their conceptualised effects on human individuals, groups, and other living things and systems.

There is, however, little research literature to inform educators' understandings of how others (pupils, students, colleagues) conceptualise environment, environmental issues, and human-environment relationships (Wals, 1992). Research based upon constructivist principles should receive attention in environmental education, largely because these principles provide a coherent framework in which to theorise about learning, on the one hand, and about these categories and issues, on the other.

These are, presumably, two areas of crucial concern to educators, yet many environmental education research reports pay little attention to theoretical considerations on learning and the generation of knowledge. From a constructivist standpoint, a valid research topic would be the explication of reasons to account for such practice, given the socially constructed nature of the entire curriculum initiative (Berger & Luckmann, 1973). Greenall Gough's (1993) research on the founding individuals of environmental education exemplifies this and so informs current practice. Goodson's (1987) historical analysis of the evolution of environmental studies in terms of the vested interests of individuals and groups similarly illuminates influences on current curriculum decision-making (Robertson, 1991/92).

Through such research, “invented traditions” can be problematised, to expose “practices, normally governed by overtly or tacitly accepted rules . . . which seek to circulate certain values and norms of behaviour by repetition” (Hobsbawn, 1985, in Goodson, 1987, p. 22). Indeed, this research may illuminate environmental education research and pedagogy across the four commonplaces of education: learner, teacher, curriculum, and milieu (Schwab, 1978). This chapter has reviewed qualitative research which has as its focus the learner, specifically learners' pre-instructional knowledge.
Individual learning, however, does not occur in a social, political, or historical vacuum. Critically-oriented research, which makes problematic aspects of context in which knowledge is individually and socially mediated, can inform our understanding of current practice. Robottom and Hart (1993, p. 25) list examples of research questions consistent with this perspective. Wals' (1992, p. 45) argument for the contextual development of environmental education, and his proposal that "it is important to become critically aware of the way people perceive their world", effectively calls for research which links Schwab's educational commonplaces. On these grounds, then, constructivism should receive attention in environmental education research.

The arguments in favour of constructivist-based interpretive research which have been reviewed in this section introduce the reader to this study's methodology. In the following two sections, attention shifts from methodology to the conduct of the study and to the context of the data collection process.

II. Research method

Introduction

This study is empirical in that its outcomes stem from the interpretation of three data sets which resulted from a process of data collection. Two sets of interview data were collected by myself with student teachers, and the bulk of the outcomes stem from analyses of these two sets (a third set was collected by an independent researcher, as discussed later). This second section presents details of the research design associated with the data collection process: the data sets, data collection procedures, data analysis procedures, and data review procedures.
Data collection: The three data sets

Three data sets were collected for this study: Data Set #1 in 1992 (DS#1), and two in 1993 (Data Sets 2 and 3). The chronological order of collection of these sets is depicted in Figure 1.

Data Set #1: Single interviews with 10 students.

Data Set #2: Multiple interviews with 10 students, plus single interview with 3 students

Data Set #3: Single interviews with the 10 Data Set #2 students (by independent researcher)

October 1992

Figure 1. Chronological order of collection of the three data sets.

While the first two data sets were based on interviews conducted by myself, Data Set #3 consists of interviews conducted by an independent researcher after my departure from South Africa. This researcher, Dr. Kevin Kelly, a faculty member in the Department of Psychology at Rhodes University with a professional interest in interpretive research, interviewed nine students who participated in the multiple interviews of Data Set #2.

Outcomes of this third data set are presented in the third section of this chapter, which deals with the context of the study.

Combining the first and second data sets

Excerpts from both Data Set #1 and Data Set #2 are used to develop the conceptualisations which are the study’s outcomes. A justification for combining these data sets is in order, given three differences between them:
different students were involved (DS#1 - 1992 students; DS#2 - 1993 students),
at different stages of the program (DS#1 - final term; DS#2 - beginning of program),
and
there were different numbers of interviews with each student (DS#1 - single
interviews; DS#2 - multiple interviews with nine students, single interviews with
three other students).

In October 1992, single interviews were conducted with 10 students in the latter
stages of the 1992 program, immediately after their teaching practicum. These 10 students
were selected on the grounds of different responses to a class-wide questionnaire which
they had completed in the first month of their program, prior to my arrival in South Africa.
For various reasons, these students had not experienced any environmental education-
related interventions in the HDE program other than the yearly excursion to the Outward
Bound Centre in the first month of their studies. In 1992, unlike the case in 1991, or
1993, there were no workshops, classes, or lectures dealing explicitly with environmental
education (G. Euvrard, HDE Co-ordinator, personal communication). Although
unexpected, this situation was fortuitous for the purposes of the present study: the
interviews probed beliefs which students had not discussed in the HDE program.

Analysis of these first interviews resulted in the development of conceptualisations
of environment and of human-nature relationships. Briefly, analysis of Data Set #1
established that students' untutored conceptualisations of the environment were diverse,
and that these conceptualisations had implications for environmental education (Robertson,
1993). The purpose of collecting Data Set #2 was to probe students' beliefs in greater
depth in order to describe more fully these conceptualisations, while remaining open to the
possibility that new categories might emerge (as was the case).
Data collection procedures

Data collection was conducted at the convenience of the participants. In all interactions with students, procedures consistent with guidelines promoted by the University of British Columbia Ethical Review Committee were followed. While the bulk of data consists of verbatim transcripts produced from the interviews, other sources of information on students' perspectives were obtained. These include responses to a class-wide questionnaire which was completed in both 1992 and 1993; and in 1993, photocopies of entries in reflective journals (in each case, with the students' consent); and assignments pertaining to environmental education. To inform an understanding of the environmental sessions in the 1993 program, members of faculty associated with the sessions were interviewed on an ad hoc basis.

An account of my role in the interviews is presented in the third section of this chapter together with some outcomes of Data Set #3, to describe the interview context. The following describes the interviews of the first and second data sets, which were conducted by myself.

Data Set # 1: 1992

The first data set comprises single interviews with ten students which each ran between forty and sixty minutes. These students were selected somewhat arbitrarily, but with an interest to include those who had provided diverse responses to the questionnaire which they had completed in the second month of the HDE program (Appendix A). They were first approached in October 1993, after their teaching practicum (i.e., in the ninth month of their program), and were interviewed in that month.

In the first half of the interview, the student elaborated on his or her responses in the questionnaire. Subsequently, a sorting exercise using 20 small cards with a word on each was used. The words were selected to represent a range of environment categories, namely, humans (including social groups) and human artefacts, non-human forms of life.
(domesticated and ‘wild’), and physical environmental features: air, child, dog, eagle, elephant, grass, house, insect, man, Me, mountain, river, road, rock, soil, tree, water, maize, woman. During each interview, the cards were laid out in front of the student (in the same order for each student) who was requested to “arrange these cards in any way you wish, in a manner which makes sense to you”. The student was then requested to account for the arrangement. The aim of this cards exercise was to facilitate discussion of relationships: for example, ‘Me’ in relation to one or more of the categories. Another aim was to ensure that each student spoke in relation to the natural world, as some students had not made any reference to the natural world in their written responses to questions on environment and environmental issues in the questionnaire.

Data Set #2: 1993

On the first day of the 1993 HDE program, all students were requested to complete a questionnaire (Appendix A). Nine students were selected as participants on the basis of responses to this questionnaire, the aim being to include students whose responses to ‘environment’ and ‘environmental issues’ indicated interpretations across the categories which had emerged in Data Set #1. An additional four students were interviewed over the duration of the second data set period. These students were selected on the basis of comments they had made in class relating to the first and second research questions. One of these ‘additional four’ students was interviewed twice. As with the first data set, interviews were conducted with single students, each interview lasting 35-55 minutes.

In sum, Data Set #2 consisted of the following sources of information: multiple interviews with ten students and single interviews with three students; photocopies of entries in reflective journals; and assignments pertaining to environmental education written by the focus group of nine 1993 students. For this group of ten students, the following audio-recorded interviews were obtained: eight students were interviewed five times each,
one student four times (one interview was cancelled due to circumstances beyond my control), one student twice, and three students once each, for a total of 49 interviews.

**Transcript designations and presentation of excerpts**

Transcripts of interviews obtained in the data sets were designated by data set, student name, and interview number (in the case of multiple interviews in Data Set #2, in Roman numerals). Where excerpts are presented, the page number of the transcript is included in the designation (Arabic numerals). All students are referred to by pseudonyms, where each pseudonym retains an indication of the student's language group and sex (e.g., names commonly used for an English female, Xhosa male, etc, were selected accordingly).

Excerpts are presented verbatim, including colloquialisms (e.g., 'Ya' for 'Yes' in the example in Figure 2). The use of three period marks with spaces (i.e., . . . ) indicates that a section of the original transcript has been excised, in order to maintain the flow of the student's response. Two period marks without spaces (i.e., ..) indicates a moment's hesitation, or an incomplete sentence. Figure 2 provides an example of a transcript designation as it would appear in this dissertation.

![Diagram](image)

Lara: Ya, it's two very distinct areas. (DS#2, Lara, IV, 26)

**Figure 2. Sample transcript excerpt designation.**
Procedures of analysis

Data were analysed by the constant comparative method (Lincoln & Guba, 1985). There were three levels of data transformation (Novak & Gowin, 1984): production of verbatim transcripts, initial framing of potential categories of description on the basis of the content of particular excerpts and comparison with similarly categorised excerpts, and the development of a framework depicting relations among the categories.

The first level of data transformation was the verbatim transcription of the tape-recordings on a computer immediately following each interview, to review the discussion and identify some responses which may have required further elaboration. In such cases, a question on these excerpts was posed to the student in the next interview.

Transcriptions were printed and read through with a particular research question in mind with the purpose of identifying, for example, different ways in which the students understood the concept environment. During this reading, descriptive words or phrases were attached to short sections of the transcript, “chunks of meaning” (Cobern, 1993, p. 938), or “utterances relevant to the question” (Marton, 1988a, p. 198). These descriptive words or phrases labelled elements of potential conceptualisations, in relation to the research questions, which were apparent in the content of the student's responses. For example, a number of students attributed the concept of rights to non-human forms of life, in support of how they believed humans should act toward them. This was selected as a potential conceptualisation (labelled ‘ethical perspectives’) in relation to the second research question (on human-nature relationships). Subsequently, sections of the transcripts (hereafter referred to as excerpts) alluding to this potential category were labelled. These excerpts were then ‘cut and pasted’ on the computer, printed, and organised by hand into potential sub-categories within ethical perspectives. The mechanical sorting allowed for numerous excerpts to be considered together, thereby facilitating the process by which the content of one excerpt was compared and contrasted with the content of another similarly labelled excerpt and in relation to the conceptualisation under consideration. In this
manner, the research interest shifted from the individual to the “pool of meanings” within a particular conceptualisation which was being framed (Marton, 1988a, p. 198).

Interview excerpts were approached iteratively, in the sense that initial categorisations were constantly compared with designated excerpts throughout the transcripts. ‘Why these categories?’, one might ask. Were these categories pre-conceived, or did they emerge from the data? Responding to this question, MacKinnon (1989a) proposes that the answer is neither. Rather, to account satisfactorily for the source of these categories, “we might think in terms of an interdependence—even a tension—that is played out” (MacKinnon, 1989a, p. 48). In other words, the origin of these categories stems from an interplay between the student's intended meanings and the analyst's theoretical perspectives. On the one hand, the student was attempting to communicate a way of understanding a relationship. On the other, I, the analyst, sought to identify qualitatively different ways in which students thought about that concept or relationship. My conduct in the analytical process was informed by both the research questions and by insights derived from the literature review. Excerpts were selected purposefully when they were recognised to communicate beliefs which had a direct bearing on the research questions.

The purpose of the analysis was to identify and describe qualitatively different ways in which students conceptualised environment and human–nature relationships, and insights from the literature clearly informed this process. It must be stressed that this study's outcome space is based upon the students' responses to open-ended questions. The categories of description are drawn from the data. They were not predetermined in the sense that I introduced these ways of thinking about environment and human–nature relationships to the students in the interviews. Throughout the research process, the primary interest was in the students' beliefs. I stress, the research process was not designed to solicit students' interpretations of categories or theoretical arguments introduced by myself. The research interest, rather, was with issues and perspectives
which students raised in their responses to the open-ended questions. The following two features of the study strengthen this claim.

First, to substantiate the open-ended nature of the interviews, the following section describes more fully my conduct in the interviews. In addition, excerpts from the meta-interviews (i.e., Data Set #3) support the claims that a primary focus of the interviews was on the students' personal beliefs and that most students experienced the interviews as a process of 'exploration of themselves'.

Second, the presentation of the outcomes relies heavily upon excerpts from the interviews: the reader will find at least one excerpt on almost every page of Chapters 4 and 5. These excerpts serve three functions: they are generative, illustrative, and persuasive.

The excerpts are generative in that they constitute an integral part of the development of the conceptualisation: that is, they convey much of its content. They also illustrate inferences and descriptive points made by myself in the elaboration of elements of the conceptualisation. Finally, by including many excerpts in the presentation of the outcomes, the persuasiveness of the claim that these are ways in which students conceptualised these concepts and relationships is enhanced. The excerpts also enable the reader to judge the appropriateness of the interviewer's conduct in the interviews, by considering the intervening comments and questions.

Review of analytical outcomes

The research method included a process of checking my interpretations of the interviews with the student participants, to enhance the study's internal validity (Merriam, 1988). Participants were provided with drafts of the analyses and requested to comment on them in any way they desired. For the first data set, an interim report was mailed to each participant. In two cases, phone calls augmented this process, and discussions were held with three of the students. For the second data set, a draft of Chapter 3, Section III ("The
interviewees' perspectives'), and drafts of Chapters 4 and 5 were mailed from Canada to the nine students who participated in the multiple interviews (stamped, self-addressed envelopes were provided for their return). While replies were received from only four of these nine students, without exception, they were satisfied with the interpretations and portrayals of the interview discussions. Finally, a draft of Chapter 6 was submitted to Ms. Eureta Janse van Rensburg in her capacity as co-ordinator of the environmental education sessions in the 1993 teacher education program; in her reply, she discussed the usefulness of the chapter for program planning in 1994, and attested to its validity (personal communication, March 4, 1994).

III. Context of the study

Introduction

A description of the broad 'macro-context' of the South African location of this study was provided in Chapter 1. This section describes the more localised 'micro-context' of the study, namely, the context of the interviews.

This section begins with a description of the teacher education program, then focuses on the environmental education-related sessions within this program. These sessions occurred in the first term of the 1993 program and are reviewed in some detail here, since the multiple interviews in Data Set #2 occurred before, during, and after them. This situation clearly has implications for the credibility of the knowledge claims. Following this review, the claim is made that the content of these sessions did not relate directly to the perspectives being explored in the second research question. As such, while these sessions provided a suitable context in which to pose environmental education-related questions to the students, interviews which occurred after particular sessions were not, in fact, probing students' interpretations of those sessions.

An overview of the participants in this study is then presented. This introduction to the students is purposefully brief, as the focus of this study was in the content of students'
explanations and not on the students themselves. During analyses of the transcripts interviewees 'lost' their status of focus somewhat, given the primary interest in how these relationships were conceptualised (indeed, a particular individual might not even be cited at all in the data analyses).

Considerable attention is given to context throughout this study. This interest is enhanced by arguments on the limitations of decontextualising cognition; that cognition is unavoidably situated with respect to contextual features (c.f., Hennessy, 1993). As Hennessy (1993, p. 2) argues, there is growing acknowledgement of the extent to which the context and content of thought are inseparable. In interview-based studies, an understanding of the context in which the interviews occurred is necessary to inform one's understanding of what was said in the interviews. However, despite the fact that "we all know that human action and experience are context-dependent, and can only be understood within their contexts", education research methods often employ "context-stripping procedures" (Mishler, 1979, p. 3). Context is considered at two levels here: the broad context of South African social landscape, and the context of the interviews.

The broad South African context in which these interviews occurred can not be ignored because of the associations with social, cultural, and political perspectives which are interwoven in many of the students' responses. Indeed, it would seem antithetical to de-contextualise a study on human-environment relationships, given the research interest to explore relationships which interviewees conceptualise to exist between themselves and their surroundings. Further, some of the beliefs which this research explored were of considerable personal significance to the students, in terms of their personal histories. A second reason for drawing attention to the broad context of the study concerns the credibility of the outcomes. The claim for a 'political' conceptualisation of environment, for example, makes more sense and is more credible if the reader has a grasp of the social and political aspects of the setting in which someone might conceptualise environment in such a manner. Whereas the meanings embedded in a political conceptualisation of
environment might be less apparent in the context of a democratic and less racist society, such as Canada, they become more apparent when considered in the light of legacies of South African race-based policies, especially when those being interviewed have been ‘on the receiving end’ of these policies. Hence, brief descriptions of the students' personal contexts are included in the subsequent data analyses chapters.

Concerning the latter, the context of the interviews, the meta-interviews which comprise Data Set #3 are an important component of this study. Excerpts from these ‘interviews about the interviews’ are used to portray how students experienced their participation in the research process.

The HDE program

Participants in this study were students registered in the teacher education program at Rhodes University, Grahamstown. This ten month program (February through November) leads to the certification of Higher Diploma in Education (Post-graduate), which is recognised nationally as a qualification to teach in secondary schools. Much of the following description of this program is drawn from Janse van Rensburg's (1993) paper on environmental education sessions in this program. Currently the incumbent in a Chair in Environmental Education at Rhodes University, Janse van Rensburg was primarily responsible for the implementation of these sessions in the 1993 HDE program.

The theoretical foundations of the HDE program are humanist (c.f., Rogers, 1983), revealed in student-centred teaching and an emphasis on the personal development of the individual, and liberal, wherein critical reasoning and tolerance for alternative viewpoints is promoted (Ashley, 1989; Euvrard & Van der Mescht, 1993). A core component is a course entitled Educational Studies, where students are introduced to philosophical, psychological, sociological, and historical aspects of education in an integrated manner, using the categories ‘The Learner’, ‘The Teacher’, ‘The School’, and ‘The Society’ (Euvrard & Van der Mescht, 1993). The 1993 environmental education sessions occurred
within the framework of this course. These sessions consisted of (i) an excursion to an Outward Bound Centre; (ii) a lecture and a student presentation on environmentalism and; (iii) an excursion to the Thomas Baines Nature Reserve and Environmental Education Centre, nearby Grahamstown. Given the association between these sessions and this study, they are described in some detail here.

(i) The Outward Bound (Hobitton) excursion. This involved travelling to the Hobitton Outward Bound Centre at Hogsback, some two hours' drive from Grahamstown, to spend four days at the Centre where we participated in various activities. The 'expedition' involved a hike of about 5 km in the surrounding hills to a site in the forest where, in small groups, we made temporary shelters, prepared food, enjoyed a communal camp-fire, and spent the night. The following day, we visited a waterfall on the return hike. Back at the Centre, most of the activities involved students working in groups to overcome particular obstacles and challenges. Students also experienced a 'solitaire' (spending two hours alone in a forest from dusk through darkness), and walked to the nearby 'Madonna and Child' waterfall to spend an hour there. As described in the HDE booklet, the overall aim of this excursion is for "students and staff .. to get to know each other” (Euvrard & van der Mescht, 1993, p. 17). Following the excursion, students were required to submit a two-page assignment on “The Hobitton excursion as education in the environment” as part of the Educational Studies course.

(ii) Environmental education sessions in the class setting. In a lecture in the third week of the program, students were introduced to environmental education as an example of a critical approach to education. Drawing on Fien (1990), the instructor reviewed the typology of education about, in, and for the environment, stressing the latter as education aimed at addressing, not just learning about, environmental problems. In addition, students were introduced to the historical development of environmental education, internationally-adopted principles (e.g., the Tbilisi Principles—Irwin, 1991), and principles of a socially critical pedagogy (Huckle, 1991, in Janse van Rensburg, 1993).
The assignment required students to perform 'environmental audits': in groups, they traced resource flows through a local enterprise, such as a bakery, and assessed broad environmental impacts of the processes and practices involved. Students subsequently made group-based presentations which consisted of role-modelling the following approaches to teaching and learning: authoritarianism, behaviourism, humanism, eclecticism, and environmentalism. However, the group which presented 'environmentalism' did so in a way which did not differ substantially from that of humanism, except for an emphasis on the integration of subject matter to show inter-relationships among various disciplines (mathematics, biology, geography, etc) (Janse van Rensburg, 1993).

(iii) In the ninth week of the program (and prior to the final interview), students went on a three-day excursion to a local nature reserve. This excursion included a lecture on principles of ecology, a workshop on drama as a medium for environmental education, a night drive in the reserve, and a discussion with subject tutors on incorporating environmental perspectives in respective teaching subjects.

Occurrence of the interviews in relation to the HDE program

The 1993 data set interviews (DS#2) occurred during the first twelve weeks of the HDE program, interspersed with the various sessions of the program described above. The following provides an overview of the 'interest areas' for each of the five interviews which comprise Data Set #2:

First interview. Probe for beliefs associated with responses to the questionnaire; discuss relationships using the cards.

Second interview. Request elaborations on excerpts of first interview; discuss Hobitton experiences.

Third interview. Probe for beliefs on schooling, teaching and learning, in relation to experiences in the previous two weeks' school observation period.
Fourth interview. (Held in Botanical Gardens) Focus on the natural world; discuss interpretations of class presentation on environmentalism.

Fifth interview. Solicit views on experiences in HDE program over first term; request elaborations on previous statements.

The occurrence of these sessions in relation to the interviews is depicted in Figure 3.

Figure 3. The occurrence of the five interviews for Data Set #2 (below) in relation to environmental education sessions during the first 11 weeks of the 1993 teacher education program (wk: week).
The interviewees

All interviewees were full-time post-graduate students in the secondary school teacher education program at Rhodes University. Ten students were interviewed in 1992, and 12 in 1993. Students were selected to participate in the study on the basis of differing responses in the class-wide questionnaire, with the additional interest to include participants from varied backgrounds (such as diverse undergraduate degrees, different cultural/language groups) and of both sexes.

Conduct of the interviews

To inform the reader's understanding of the conduct of the research, researchers normally provide a retrospective description on how they went about the study. Although rarely acknowledged, this is necessarily the researcher's interpretation of the process. An assumption implicit in this practice is that the reader must accept the researcher's claims as to how the research was conducted. Interestingly, in quantitative studies, researchers invest much effort in establishing the credibility of the research instruments. In interpretive studies, the researcher is effectively the primary 'instrument' in the data collection process. Since the research outcomes stem directly from the interactions between researcher (as 'instrument') and interviewee, it is necessary to establish the researcher's credibility as a competent interviewer. This was one purpose for including the meta-interviews (i.e., Data Set #3). Outcomes of these meta-interviews also provide the reader with insights into the interview context as conceptualised by the students. Consequently, these insights introduce the reader to the main body of the interviews, and their analyses. For these reasons, the following description of the conduct of the interviews consists of two subsections: a report from the researcher's perspective, and a report from the interviewees' perspectives, drawn from the meta-interviews.
The researcher's perspective

Students were encouraged to speak freely and to elaborate on their own views throughout the interviews. It is necessary to stress the importance, in terms of the purpose of this study, of this interest in the students' personal views.

This interest was explicit in the way in which the research was introduced to the students and implicit in the manner in which the interviews were conducted. Concerning the former, in both the covering letter to the questionnaire and the 'Student Teacher Consent Form', the study was presented as “research on teachers' views of teaching, learning, and environmental education”. I also stressed my non-evaluative role as a visiting researcher temporarily associated with the Education Department.

Concerning the conduct of the interviews, following advice from Belenky, Clinchy, Goldberger, and Tarule (1986, p. 10) and in keeping with a phenomenological approach, I adopted an open and leisurely approach in order to establish rapport and allow the students' perspectives to emerge. The interviews began with open-ended questions, that is, questions which supplied a frame of reference for the student's responses, but put minimum restraint on the responses or their expression (Cohen & Manion, 1989, p. 313). Questions which the interviewees faced, whether in the questionnaire or posed by myself, were worded in a manner which encouraged the student to choose the particular topic on which to speak. To encourage the student to speak about an environmental issue, for example, no particular issue was named. The student was asked (first, in the questionnaire and subsequently in the interviews) to “name an environmental issue of concern to you”. In this manner, issues which were raised for discussion by the student were used as a vehicle to allow the student to express themselves with respect to environmental issues, however conceptualised. The content of what was discussed was for them to decide. My goal in the interviews was to encourage students to present an opinion on an issue they had raised, then facilitate a discussion in which they articulated their beliefs in relation to that issue.
In the case of the second question, on human-nature relationships, this necessitated posing numerous ‘Why?’ questions. In responding to these questions, students articulated their eco-philosophical perspectives. For, as Arne Naess contends (in Fox, 1990, p. 92), asking strings of ‘Why?’ and/or ‘How?’ questions eventually takes one beyond the realm of the everyday, the technical, and the scientific, and into the realm of the philosophical.

This interview approach stems from an underlying perspective on the research process and a commitment to humane values. Robottom and Hart (1993, p. 520) refer to a “politics of method” in education research, by considering relationships between ideological features of the research methodology and the substantive research questions being asked. Given that a purpose of the present research was to explore students’ beliefs, an attempt was made in the interviews to shift the balance of power away from my posing pre-determined questions alone to one where the interviewee has greater control over what is discussed.

In retrospect, the form and quality of my questions were often hesitant and self-critical as I struggled for probes to facilitate the students to articulate their beliefs. In a similar post-study reflection, Paget (in Mishler, 1986, p. 97) suggests that this form of questioning may allow for, even encourage, replies that are equally searching and hesitant. That is, one creates a situation where the respondent, too, struggles to articulate his or her understandings:

... researchers and subjects may treat each other as ‘significant others’.

Subjects respond to the researcher not simply as an ‘objective’ scientist but as a person with personal qualities and views, and their behaviour towards the investigator resembles their behaviour with others in their own worlds.

(Mishler, 1986, p. 125)

A variety of strategies were used to direct students’ attention to the natural world and encourage responses in relation to the second research question. The ‘Cards’ exercise,
with cards such as ‘air’, ‘elephant’, ‘insect’, ‘tree’, ‘water’ (see list on p. 65), for example, facilitated discussion of ‘Me’ in relation to natural components. In addition, students were requested to discuss their thoughts and experiences in relation to particular experiences in the program. In the second interview, which occurred after the Hobitton excursion, students were questioned on aspects of the excursion—such as the expedition, the Solitaire and the visit to the ‘Madonna and Child’ waterfall—in an open-ended fashion. Questions such as “How did you find the visit to the waterfall?” were put to the student, whose responses were then probed. In this manner, while I as researcher set these aspects of the context of the discussion, the student selected the content of what was discussed.

Special care was taken to adhere to interviewing techniques consistent with warrants which allow one to move from data to conclusions in a defensible fashion (Lythcott & Duschl, 1990). In particular, attention was given to two warrants, namely a “novel verbiage” warrant, and a “meanings” warrant. Concerning the former:

... novel verbiage used by an interviewee (verbiage that has not been introduced into the conversation by the interviewer), reflects a part of the cognitive system of that student, that is, what he or she knows. By verbiage, we mean here to include both words and their meanings. (Lythcott & Duschl, 1990, p. 451)

Other than occasionally challenging the student on a particular way of thinking which they were espousing by suggesting an alternative perspective, strenuous attempts were made throughout the interviews to ‘go with the student’.

Concerning a “meanings” warrant, words with scientific meanings “may only have the meanings ascribed to them that are given in conversation by the interviewees” (Lythcott & Duschl, 1990, p. 552). Partly with this warrant in mind and partly with an interest to explore particular statements made in a previous interview, students were often requested to elaborate on intended meanings of phrases in subsequent interviews. Following Wolcott's
(1990) suggestion, I did not mind “presenting myself as a bit dense, someone who does not catch on too quickly, and has to have things repeated or explained” (p. 133).

To conclude, the goals of the interviews were to create the conditions in which the interviewee “says what he or she means, means what he or she says, says what he or she thinks, and thinks about what he or she says” (MacDonald & Sanger, 1982, p. 181). A purpose of the meta-interviews (Data Set #3) was to provide insights on the extent to which these goals were achieved, from the students' standpoint.

The interviewees' perspectives

The following insights into how students experienced their involvement in this study derive from the interviews conducted by Dr. Kevin Kelly (Data Set #3), a faculty member in the Department of Psychology at Rhodes University. Dr. Kelly interviewed the nine students who had participated in the five interviews of the second data set, two months after their last interview (list of questions in Appendix B). The audio-recordings were then mailed to Canada, where verbatim transcriptions were made.

Students' impressions of their involvement in the interviews aligned with my account of the conduct of the interviews (above), to varying degrees in particular cases. In the following overview, excerpts of the meta-interviews communicate some of the students' experiences of the interviews in their own terms. The purpose of this overview is to support the following claims:

- the interviews elicited students' personal beliefs—most students experienced the interviews as a process of 'exploration of themselves';
- a degree of trust and rapport between researcher and interviewees was established; and
- students, while hesitant at first, felt free to speak their views—to speak honestly.
Without exception, students understood that the aim of the interviews was to explore their personal views. Andrea considered that:

Andrea: All the way along, it was really what we thought and felt. A really good interview was when we went up to the top of Bots (Gardens), and sat there and spoke about what we saw, and what things meant the most to us. (DS#3, Andrea, 1)

Similarly, for Siyanda:

Siyanda: I think that he was trying to research how we feel about things. About the environment, and about the classrooms. He stressed a lot on the environment. How I feel about certain things. (DS#3, Siyanda, 1)

Students found it difficult, however, to express their personal thoughts:

Jennifer: I think I found some of the things very difficult to put into words. You know, you have personal feelings, and it's difficult to express them. Not thinking what the other person wants. It's just difficult to express things, especially if you haven't thought about them for a long time. (DS#3, Jennifer, 2)

Given this interest in personal beliefs, the interviews clearly had an effect on some students. While the relevance of her personal beliefs to the goals of the study was not always apparent, Jennifer appreciated the opportunity to become more aware of her own views:

Jennifer: Some aspects actually made me think about things which I thought I understood for myself, but I had never really consciously thought about them. It was interesting to find my own opinions: it sort of solidified them. And gave them more direction.

Kevin K.: So, you say that the process actually helped you to clarify for yourself?
Jennifer: Yes, a lot. Certain issues, like, even personal issues, which I don't know if he got anywhere from them, sort of animal, anti-cruelty, anti-experiments, that was my personal interest, but it enabled me to look at it more clearly, and to motivate and direct myself.
Kevin K.: So, the actual questions assisted you to think further?
Jennifer: Yes, on personal issues for myself... I think it was more a sort of consolidation. Because, what came through a lot for me in answering the questions was my feelings towards my previous feelings. (DS#1, Jennifer, 2; emphasis in original)

Likewise, Andrea found herself thinking about the relationship between what she was saying in the interviews and aspects of her lifestyle:

Kevin K.: Did you ever feel that the interviews actually influenced your views?
Andrea: I don't think they necessarily influenced my views. They just made me think more about them. And probably, take more action. Or, just be more aware of things that I do. (DS#3, Andrea, 5)

Having offered a similar description of the goals of the research process, Gavin's experience was that the interviews, on the one hand, “invaded” his privacy and, on the other, informed his self-awareness:

Gavin: Once I said I liked trees, then he wanted to know ‘why?’. Lots of those kind of questions: ‘Why?’. You know something, and, you know it's right, but he wants to know why you feel it's right. Questions like that. Having you examine yourself as to why you feel this or like that.
Kevin K.: And, what was it like to be asked those sort of questions?
Gavin: On the one hand, it was like being invaded. But, on the other hand, it made you think: why do you like this? Why do you like trees? So, mostly, I would say, it helped me a lot, because it helped me to discover my values, why I believe in things, that I just accepted beforehand. Stuff like that. (DS#3, Gavin, 1)

In Sibu's case, the process of being asked to provide responses to ‘Why?’ questions was difficult and one that he had not encountered before. It also made him feel uncertain:

Sibu: Well, for me, I think, it was difficult, because I had never asked myself questions like ‘Why?’ ‘Why?’ I just take things at face value. So, I think
those questions, really, were a bit difficult. Anyway, I did answer them. They made me to think about the things. To start questioning the things that I was not really bothered about before. Ya. For instance, there were questions about environments. So, when he started to ask me ‘Why?’, ‘But, why?’, You see, I have never asked myself such questions. It is something that just comes. Without having questioned ‘But, why?’. So, I think those were the type of questions that really made me find the interview getting tough.

Kevin K.: Was it actually a bit difficult sometimes?

Sibu: I mean, if someone asks you a question that you are unable to answer, you see, it makes you a bit uncertain. Especially, if it is something that you have really believed in, something that you have never questioned yourself about. (DS#3, Sibu, 2)

Andrea, on the other hand, appreciated the opportunity to explore her own thoughts and values. The following excerpt is drawn from the final interview of the second data set:

Andrea: It's been quite good to just speak about it. It's almost as if I've been challenged, but I know you're not doing that! But I have to actually think of reasons why, and why I'm aware of things. Which I think has been a benefit to me.

Alistair: How so?

Andrea: Just in clarifying what I believe in, and making me think about applying it. I mean, I've spoken to friends, but I've only really got one friend that I speak about these kind of issues to. And, even then, never extensively, like this. Or in a different vein, that's probably more ‘What are we going to do?’, or, more factual, as opposed to speaking here about my values, my thoughts on it. (DS#2, Andrea, V, 41)

For Gavin, the persistent ‘Why?’ questions encouraged him to speak his own views, partly because he would be able to account for them more easily:

Kevin K.: Now, if you had said:“Ag, environment stinks”, you know, “I don't really care ..”

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Gavin: Yes, but then he would have wanted to know why. So, I never thought that I couldn't say anything that I didn't feel. Because, then, I would have to say why. I would have to defend that view. (DS#3, Gavin, 3)

One student saw the interviews as a form of evaluation of her knowledge. In response to a question on why she was selected for the study, Phetie considered that it was probably a result of not having expressed herself clearly in her written responses to the questionnaire. Never having experienced such a questioning process before, she placed little confidence in her personal knowledge. She wondered, for example, why the interviews began before she had experienced any lectures:

Phetie: Once we had that lesson, he would come to the interviews, and it was sort of evaluating my knowledge of those lessons. Whereas, in the beginning, I knew nothing about the environment—we had not started the course.

Kevin K.: And then as the lessons proceeded?
Phetie: Yes, even the questions he asked, they were evaluating how much I know now. (DS#3, Phetie, 6)

Nonetheless, Phetie considered that the interviews encouraged her to make explicit her own views, and as the interviews progressed, she became more relaxed:

Phetie: At least he opened me, because, really, I am not the type who speaks out. So, I think, with the interviews, they really helped me to speak out myself.

Kevin K.: How did he do that?
Phetie: Persistence! Leave that question and go on, and then, as you answer from the questions, he will find that, OK, then you know this answer. You are answering the question now. And that question is related to the one you didn't know. And, you will go back to that question, and ask it again, maybe not the way he. He used to excuse himself: 'Maybe I am asking stupid questions', or, 'Maybe I am confusing you, because now you are answering this question, and yet you didn't know this question at first'. So, he would go back to that question, in relation to the one before.

Kevin K.: So, by the end, you felt more open?
Phetie: More open. More interviews. I think I got more relaxed with him. (DS#1, Phetie, 4)
All students alluded to feeling more relaxed, more open, and more willing to discuss their views as the interviews progressed. This was partly a consequence of increased familiarity, which was enhanced by the numerous opportunities we had to interact with each other on a 'non-research' basis during the Outward Bound excursion. During this excursion, I made a point of acting not as a researcher, but as an addition to the class. The perception of developing trust which grew from this increased familiarity was especially important for those students who experienced the interviews to be probing knowledge of considerable personal significance:

Lara: The questions were quite tricky. Well, not so much difficult, but rather, very exploring, what was within us. Sort of 'plumbing our depths' kind of thing. I think all of us are fairly private people, and especially, the sort of inner meanings of life can be .. Sometimes, you don't want to expose yourself like that.

Kevin K.: Can you remember one or two of those questions that were a bit difficult, or a bit personal?

Lara: I think, especially, he was interested in how we define the environment. You know, whether it was a personal thing for us, or whether it was just something out there. And, for me, it is very much a spiritual kind of thing, you know? And he did try and explore that a bit. And, that's something that is very personal.

Kevin K.: So, something that is close to you, and you don't ..

Lara: Yes, you don't just easily divulge it to just anybody. I think it's just important that the other person understands what you are actually talking about. I think some of my perceptions and things were perhaps very different, eastern philosophy, that kind of thing. And, it was easy for me because I realised that Alistair was—I don't know, there are sort of different levels of conversation, and we could get down to a deeper level, and he could come there with me, kind of thing. Whereas, I don't think just any, anybody could have done that. So, for me it was important that I knew that he was understanding what I was trying to get across. Otherwise, I don't think there's any worth in putting it across, if that person isn't going to relate to it. (DS#3, Lara, 2)
Lara’s comments point to the importance, in studies of this nature, of establishing a degree of trust and empathy with students and their responses. This empathy was implicit in a respectful attitude of the researcher to the students’ responses, rather than explicit in the form of, for example, agreement with particular responses. As Lara observed:

**Kevin K.:** What gave you the sense that he was “with you”, or that he was kind of grasping?

**Lara:** I don’t know. I don’t know if you can even .. maybe it’s more of a subconscious thing in certain ways. Because, he didn’t really expose too much of himself. Or say: Yes, I do agree, on this or that. Ya. Either you feel there is a connection, or you don’t. (DS#3, Lara, 3)

Andrea discussed how her perception of the interviews evolved: initially cautious, she attempted to phrase her responses in an “environmentally-friendly” manner. As the interviews progressed, she became “more honest”:

**Kevin K.:** I wonder what caused that shift? Towards greater honesty?

**Andrea:** Just knowing him better. Even from the beginning, it’s not like I changed what I was. I just didn’t open up as much. And, I suddenly thought, you know, ‘He’s not judging me’. He’s actually looking for something that’s in all of us. None of us will ever be totally .. ecologically friendly, or whatever. This is about me. (DS#3, Andrea, 3)

Andrea’s last comment in the excerpt above encapsulates an important goal of the interviews: to probe students’ personal perspectives, encouraging them to articulate the specifics of what was discussed. Lara, especially, appreciated the opportunity to influence the direction of the interviews:

**Lara:** I think I really appreciated that there was no feeling of putting a parameter on anything. Which obviously makes it difficult for him. You know, I think sometimes within the interview, he would struggle not to direct it too much. Rather just follow on from what we had just been saying, and let the interview just take its own path. (DS#3, Lara, 4)
CHAPTER 4

Conceptualisations of environment and environmental education

Introduction

This chapter presents outcomes of analysis of the data for the first question:

What are some qualitatively different ways in which students conceptualise environment and environmental education?

The concept ‘environment’ was described earlier in terms of conceptual interactions between people and their surroundings. This description is consistent with the relational perspective on conceptualisation adopted in this study and it allows for the possibility that students may conceptualise environment in qualitatively different ways. The categories described in this chapter portray different ways of thinking about this relationship.

In one sense, what follows are interpretations of a word, a concept. The data collection began, after all, by asking students to describe their interpretations of ‘environment’, and the analysis in this section draws on the transcripts which resulted from these discussions. Bearing in mind that the interviews were conducted in English and that English was not the first language for some of the students, it became apparent that the degree to which we shared a common linguistic base varied. Nonetheless, all students were graduates of English-medium degree programs.

The outcomes represent more than interpretations of an English word alone. In the responses to the interviews, in which students elaborated on their written responses to the questionnaire, they espoused thoughts about their surroundings—about aspects of the world around them. It is imperative that the reader understand that these questions were phrased intentionally in broad terms (as discussed in the previous chapter); for example, “describe an environmental issue of concern to you”. Some students chose to focus their discussion on nature and consider human impacts on, for example, non-human life. Some students focused on social interactions, and some placed emphasis on how political policy influenced
the way they and people like them interacted with their surroundings. Students often referred to the association among personal interests, experiences, and their views on environment. In considering the content of their responses in relation to their personal histories, it was clear that the different foci of awareness had significance in terms of the students' interests and experiences.

In each case, the first excerpt which the reader encounters is the student's response to the questionnaire (Appendix A). For ease of reference, the following questions in the questionnaire provided the starting point for our discussions:

- **Staff in the Education Department here have an interest in encouraging environmental education. What do you understand by the word 'environment'?**
- **What do you think a program in environmental education should seek to accomplish?**
- **Please describe one or two environmental issue(s) in Southern Africa of particular concern to you. Which aspect concerns you?**

The aim of the research was to sample conceptualisations, not people. However, as argued in the previous chapter, in the process of focusing on the content of particular excerpts, there is a danger of 'losing' both the student as a person making sense of his or her surroundings, as well as the contexts in which that sense-making was occurring. Consequently, elements of conceptualisations are presented 'by student' in this Chapter. In the first category, for example, excerpts of interviews with Sibu, Siyanda, Mandla, Andrea, and Andiswa are presented in consecutive fashion. This also helps to introduce the students to the reader: including references to each student informs the reader's understanding of the context in which the words were said. In particular, this introduction to the students themselves enhances the reader's understanding of the significance of a particular way of thinking about environment in terms of the students' experiences.

Having been included in the portrayal of a social conceptualisation of environment, the five students named above may or may not appear in subsequent categories. This is because the reason for selection of particular data was the interest in the content of the
student's responses. The conceptualisations are presented as distinct for analytical purposes only. They were organised with the following labels: 'social', 'political', 'bio-physical', 'integrated system', and 'part of one's self'.

A social conceptualisation of environment

A social conceptualisation of environment portrays a way of thinking about one's surroundings where inter-personal behaviour in social settings is a main focus of awareness and interest. To substantiate this, data drawn from five students is presented below.

Sibu, a Zulu-speaker from northern Natal, with a B.A. degree from The University of Fort Hare (majors in Psychology and Biblical Studies) had worked as an assistant teacher in the town of Ngwavuma prior to commencing his current studies. In response to the question "What do you understand by the word 'environment'?", Sibu wrote "one's surroundings, and different situations and experiences in one's surroundings". Features of his environment, that is, his surroundings, which he chose to discuss concerned social settings. When asked to elaborate, the content of his response referred to culturally-appropriate behaviour:

Sibu: One's environment is where one finds himself, and then, the situation, and all the things that surround him.

Alistair: What are these "things"? Can you use other words?

Sibu: I can think of behaviour, how people of that particular place or environment behave. Then things like, practices. Or maybe things like customs. What is right for my environment, could be wrong for another environment.

( DS#2, Sibu, I, 3 )

Sibu went on to discuss inter-personal behaviour in social settings, by describing his experiences in the Cape Province among Xhosa-speaking people who adhered to cultural beliefs and associated practices that differed from his own. In the excerpt below, he refers to initiation rites widely practised among Xhosa people (and not among Zulus such as himself), whereby boys are initiated into manhood:

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Sibu: The first time I came to the Cape, and I found that there were many things that they were doing, that we were not doing at home. For example, there are these boys who go for initiation, and when they come back, they no longer expect you to call them 'boys', but to call them 'brothers'. With us, to say someone is a 'brother', you have their respect. So I, now, don't attend such things like initiation schools, but when you meet such people who have gone there, they will always regard you as a 'boy'. That becomes an insult, because I am no longer a 'boy'. So, this thing of being from one place, and going to other places, has its own problems. (DS#2, Sibu, I, 3)

Concerning goals of an environmental education program, Sibu wrote that students should be taught about "the effects of environment on one's development and behaviour. Secondly, the ways of understanding people from different environments". When asked to elaborate on this response, he reiterated his interest in the diversity of culturally-appropriate actions across social contexts:

Sibu: I was thinking about if people were to be made aware of these issues, it would be wise to make people aware that their social life, the social life that they are leading may not be the social life that other people are leading. What we do here may not be something that is done elsewhere. (DS#2, Sibu, I, 3)

After Sibu had spoken on 'environment', I asked him to speak on the place of nature in his understanding of environment. The natural world constituted an ever-present backdrop to the social features of his surroundings, and it was these social features which he showed more interest in. When he thought of environment—his surroundings—he thought of these social features, rather than ever-present natural features:

Sibu: Well, I always see nature as part of my environment. With that, I think it's one and the same thing. Because nature is always the same everywhere, and there are mountains, trees and rivers here and they are also there. Well, maybe it's because when I think of one's environment, I think more of
one's surroundings, rather than nature. Maybe it's because of the way I understand the concept of environment. (DS#2, Sibu, I, 4)

Sibu clearly interpreted the question in terms of “one's surroundings”. If one considers ‘environment’ to refer to the external conditions or surroundings of an organism, Sibu repeatedly raised social features of his surroundings for discussion in this interview. For Sibu, these different ways of thinking about environment possibly resulted from translation difficulties, bearing in mind that English is his second language. However, he was clear that he did not think of nature when he thought of his surroundings:

Sibu: When you speak of environment, I always think of one's surroundings. In my mother tongue, when we think of nature, such as trees, and animals, there is a word for that: imvelo. That's where I have this confusion between environment and nature. I don't think of nature when I think of environment. . . . In fact, I was not aware that nature contributes much towards what the question was asking. (DS#2, Sibu, I, 4)

In the first two interviews, Sibu conceptualised the natural world as distinct from the human social world. In the second interview, for example, he offered a perspective on his responses by observing that he tended to think of social influences. To develop this perspective, he contrasted “environment” with “nature”:

Sibu: In my mother tongue, there is nature, which is imvelo, and there is also environment. So, when I reacted to that question about the environment, I thought of things that affect me socially. I didn't think about natural conditions like water, air. When we speak of environment, one thing that dawns onto my mind is something else, other than this natural condition. (DS#2, Sibu, II, 7)

Sibu's arrangement of the cards was consistent with his interpretation of environment in terms of a focus on interpersonal behaviour: cards relating to the social world were placed together with ‘Me’, and distinct from cards relating to nature. In this way of thinking about one's surroundings, then, features of note are those which concern
social interactions. The natural world, being ever present, is less noticeable and receives less attention.

Siyanda, a Xhosa-speaker from the eastern Cape, had completed a B.Sc. degree at Rhodes University, with majors in Biochemistry and Microbiology. As was the case with Sibu, Siyanda associated ‘environment’ with interpersonal behaviour:

Siyanda: The word environment means the surroundings: these control a person’s life. The way people behave in the area where one lives affects one’s life. (DS#2, Siyanda, I, 3)

Siyanda was living with her parents in central Natal among Zulu-speakers. Given the extreme antipathy in many areas of Natal between supporters of the (predominantly Zulu) Inkatha Freedom Party (IFP) and supporters of the African National Congress (ANC) (a national organisation with strong roots among Xhosa-speakers), her references to violence as a factor controlling her surroundings drew on her experiences in this strife-torn region.

The “things” of note in her environment all directly concerned social interactions:

Siyanda: Well, I think the surroundings, the place where you stay, is the environment. All the things, like, in the location where I stay, there is a lot of violence going on. So, the environment there controls my life. There's violence, so I can't just go to town any day that I like to go. If there are rallies and all that. In my location, it is divided into two areas, the place where the ANC is, where only ANC members are living, and there is a place where only IFP members are living. I can't go to the place where IFP members are staying, because there is also a problem with my language: I am Xhosa, and they are Zulu. I mean, if I am Xhosa, the IFP members will be angry at me, and maybe they'll beat me or shoot me. So, these things in my environment control me. (DS#2, Siyanda, I, 3)

Siyanda elaborated on her awareness of nuances of social settings as she talked about the freedom to criticise people in authority. She saw people's behaviour as an important environmental variable:
Siyanda: I have a problem with criticising people in authority. I first study the environment: their behaviour. If they are not friendly, then I don't feel free. But if people are friendly, then I feel free to say they are wrong. (DS#2, Siyanda, 1, 8)

The two environmental issues which Siyanda wrote in her response to the questionnaire were the lack of schooling facilities in 'black' townships and the depressed state of the economy and its association with a lack of textbooks in schools. When asked to elaborate on these issues, however, she commented that she didn't really know what was required of the question, and alluded to a difficulty with interpretation of the English concept environment. While reflecting on her responses to the questionnaire during the fifth interview, she commented on her greater awareness of social aspects of her surroundings, in relation to natural features. Like Sibu, the natural world provided the stage on which more noticeable features of her surroundings, such as politically-motivated social violence, occurred:

Alistair: What aspects of environment do you tend to think of?
Siyanda: Well, I am aware of the politics.
Alistair: So, it can be political, social. And, nature?
Siyanda: Now, it is mainly political. Well, I have to admit that nature . . well, it is not something that I think of. I do think of it sometimes. But before then, I didn't even think of it.
Alistair: Before your university experiences?
Siyanda: Yes. So now, well, I do think about it sometimes. (DS#2, Siyanda, V, 28)

Siyanda's views on appropriate educational goals were consistent with a social approach to conceptualising environment. She placed considerable value on respectful interpersonal behaviour as an indicator of one's educational attainment:

Siyanda: I think education is not only about learning what we are being told by the teacher: it's also about your behaviour. So it is also concerned about your behaviour in the environment. The way you should behave, and the way you should control your social life. I think an educated person is a person
who interacts well with other people, and who has knowledge, and who the people benefit from. (DS#2, Siyanda, I, 3)

An uneducated person, by contrast,

Siyanda: ... is a person who doesn't show respect, and who doesn't care about other people. Like a person who can just go around in the street and scold and scold. I don't think that person is an educated person. But one thing I have realised: some of our people don't value education these days. I have seen a lecturer at (The University of) Fort Hare. If you see him, he is just a guy, and .. he doesn't have a very good personality. He is always drunk, and he is always sitting with girls. He is educated, he is a lecturer, but, you don't gain anything from that person. (DS#2, Siyanda, III, 2)

Siyanda's interest in interpersonal interactions persisted through the course of the interviews. For example, when asked in the third interview what environmental education means to her, she commented:

Siyanda: I think environmental education is interesting, because, it involves everyone. Every person is involved with that kind of education. So, environment, you can say, is about the interaction with other people, and which environment are you living in. So, that, the environment actually guides you how to behave and how to guide your life. (DS#2, Siyanda, III, 4)

Siyanda saw little difference between the concepts of education and environmental education. She was unsure, for example, on the place of nature in environmental education:

Siyanda: Maybe, in environmental education, you also have to know about animals, and their interaction, plants? I don't know. (DS#2, Siyanda, III, 5)

In terms of this social conceptualisation of environment, she saw little difference between education, in general, and environmental education, in particular:
Alistair: Do you understand environmental education to be different to education?
Siyanda: No, I don't think so. I don't think it's different. Because, let's say for instance, in 'black' schools: the environment there is more politics going around, and it's also affecting the schools. So, people are more interested in politics, especially the pupils at schools: they are the main activists in politics. So, now, you see, it's affecting the school. Even the running of the school is affected by politics. These all affect the school environment, so I think environmental education has everything to do with the school.

(DS#2, Siyanda, III, 6)

Siyanda considered that environmental education has “everything to do with (social and political aspects of) the school”. This social conceptualisation persisted through her experiences in the first term of the HDE program. Consider her responses in the final interview:

Siyanda: Well, as I said, environment is the whole surroundings.
Alistair: And the Xhosa word okusicqongileyo?
Siyanda: Yes. The whole surroundings. Not just in your area, but in the country as a whole, because you are affected by what is happening in the country. So, that's the environment. (DS#2, Siyanda, V, 28)

In a separate discussion with Professor P. Mtuze (Head, Department of African Languages, Rhodes University), he noted that an English interpretation of okusicqongileyo was “that which surrounds us”. While one may associate natural phenomena (bio-physical features) with this term, it is open to wide interpretation. Thus, like the English concept environment, it may be conceptualised in different ways. The different ways in which students interpreted their surroundings, namely, the different features of their surroundings (e.g., social, political, bio-physical) which they seemed to be more aware of and which they chose to discuss underlie the different categories being presented here.

From the eastern Cape, Mandla had graduated with a B.A. degree from the University of Fort Hare, having majored in Business Economics and Industrial Psychology. Drawing together numerous strands associated with a conceptualisation of
environment focusing on the social world, Mandla's initial description of environment was "the conditions of society, that is, economical, socio-political, technological, in which one is situated, and the interactions involved in that". While elaborating on these categories during the first interview, he made no mention of bio-physical features as environmental factors. He drew on personal experiences of his surroundings which had influenced his life considerably:

Mandla: To quote an experience of myself: I have missed three years without writing examinations, due to politics, and all that. So, I regarded that as an environmental factor in education, influencing my own education. Boycotts and all those things, you see: the unstable things which really affect you.

(DS#2, Mandla, I, 3)

In discussing goals of an environmental education program, Mandla stated that "social conditions of the environment should be conducive to allow effective learning". In terms of a social conceptualisation of environment, environmental education is seen as an approach to education which would address these social environmental issues. The issues which he raised to illustrate this point were those which faced his own community, such as the high incidence of crime and school-girl pregnancies:

Mandla: Like for instance, crime. In our areas, it is at such a high rate. So I think, of course, there's going to be a link, now, between all these things, because crime is derived from the fact that the families don't manage somehow to keep the youngsters at school. Now, at a later stage, that particular person becomes a drop-out, and he will seek some way of living.

Alistair: Now, what can be done in schools about that?

Mandla: Yes, I think, in schools, there can be programs. Of course, this can't cater for the whole unstable environment. For instance, sex education: some people become drop-outs due to pregnancy. I don't know how to put it, but, if you can have that as a subject at schools, so as to make people aware, try to build at least a healthy environment. Somehow, in our schools, we tend to go behind that, and teach only these straightforward
subjects: mathematics, physical science, biology, and it ends there. We don’t explore other more useful areas. (DS#2, Mandla, I, 4)

Originally from Johannesburg, Andrea graduated from Rhodes University with a B.A degree majoring in English and Psychology. When asked to elaborate on her description of environment as “the microcosm of our immediate dwelling area”, she referred to social features of her immediate surroundings:

Andrea: Microcosm: at the moment, my environment, is sitting in this room.
Alistair: Now, what are some features of this environment that you are aware of?
Andrea: In this room? It’s a fairly formal setting. Sort of, not like going to a party. I’d be very much aware that it’s an educational setting. So, I think that part of environment is important. Then it’s also larger, whether you come from upper class, or lower, that affects us in some ways. All of that, to me, comes under the microcosm, and then, macrocosm is that I think that everything fits. (DS#2, Andrea, I, 3)

In response to a question on goals of an environmental education program, Andrea reiterated a similar interest in social aspects of environment:

Andrea: We should become more aware of the environment about us.
Alistair: Now, what are features in that environment that are uppermost in your mind?
Andrea: I think I’m thinking particularly of authoritarianism. As a child, you are often brought up and you just believe that your parents are right because they are in authority. And, they enforce rules on us, and we never question them, and we never question the effect on us in our later lives. (DS#2, Andrea, I, 4)

Andrea went on to blend this interest in social interaction with bio-physical features:

Andrea: So, that is important. But then, extend that questioning to the effects that mankind has on our environment, as in nature. Each little bit of damage: every time I litter, or whatever, it’s actually going to have an effect on the larger environment. (DS#2, Andrea, I, 4)
As mentioned earlier, a social conceptualisation of environment is portrayed for analytical purposes only: any category should not be considered to be necessarily distinct in terms of any individual's beliefs. Andrea, for instance, often conceptualised environment combining both social and bio-physical elements. For example, in the fourth interview, I asked her to consider her previous responses:

Alistair: When we started off, you often talked about the human world. Now, what can I infer from that?

Andrea: I would say, basically, my life in Grahamstown, is involved with people: being at university, my friends. Ya, that's how I see it. Ya, definitely. I would have said it again. I would have included the human side. And yet, I love hearing the sound of crickets. I have got a cricket in my room, and, [laughs] I love it when it suddenly chirps up!

Alistair: You “love it”?

Andrea: Ya, it's really nice: I wouldn't want to kick him out! It's kind of a friendly sound: “Hell, there's someone else living here”! (DS#2, Andrea, IV, 30)

Underlying her understanding of the associations between these categories is a more profound understanding of their interrelatedness, and an explicit concern for issues relating to social justice:

Andrea: I think that, in my view of environment, increasingly, because there's such disparity of wealth, it's all very well the wealthier people saying “Yes, we need to save the dolphins”, but a very major problem is that people don't even have food to live on. And their basic needs therefore have to be filled, you know: shelter, and food. So that's very much a part of our environment as well. And I think we need to address the needs of our people, and actually look at our environment in terms of Man, even, and try to balance that out. Even just through allocation of subsistence farms. (DS#2, Andrea, I, 5)

In other cases, when students espoused a social conceptualisation of environment, references to physical features of their surroundings—the ever-present backdrop—were only raised in the interview when they were associated with people's needs. This approach
to thinking about natural features was exemplified in some of Andiswa's responses. From a township in the Eastern Cape, Andiswa had graduated from Rhodes University with a B. Comm. degree in Accounting and Commercial Law. When asked to describe “an environmental problem in the country”, Andiswa acknowledged her tendency to focus on social issues:

Andiswa:
I don't know what you mean by environment, because I have been expounding on an example, but maybe I am interpreting environment differently from what you expect?

Alistair:
My interpretation of your view of environment is that it's community-based.

Andiswa:
Yes, and one of the things that affect us environmentally is the water for the townships. Water, like, if, with my township, how can people live for two months with no water? With us, they (authorities) just cut the water, and we live without water. You just have to go and get water, so I think water and electricity, these are an environmental problem for the community.

(DS#1, Andiswa, 4)

Social environmental problems associate closely with political issues, as indicated in this excerpt, and there is much in common between a social conceptualisation of environment and the next category, a political conceptualisation.

A political conceptualisation of environment

Beliefs and values which form important elements of this conceptualisation include a concern for social justice, an awareness of economic inequities and the politically-disempowered status of the majority of South Africans, as well as a rejection of structures and viewpoints seen to be associated with “unrepresentative” authorities such as the national government and local councils. For some students, there were immediate and obvious associations between these political factors and the natural world. From the Ciskei region, Vuli had studied mathematics, geography, and zoology at the University of the Western Cape. In one of his responses on the questionnaire, Vuli wrote that “environment
entails the relationship between man and his surroundings”. Expanding on his use of “relationship” in the interview:

Vuli: What I was referring to is, what kind of cooperation can you actually get between man as a species and the environment, meaning the earth as such. So I didn’t want to portray it as man being superior to the environment, hence I used the word relationship: it’s a sort of ‘mutual’ relationship. We can’t do anything without the environment, so we need environment for our own survival, so we need to take care of this environment, not to actually abuse it. (DS#1, Vuli, 1)

Political elements were evident in the numerous references Vuli made to influences on this “man—earth” relationship. The points he raised concerned different ways in which the political dispensation determined the flow of natural resources to different social groups. Vuli’s focus of concern was with economically-impoverished people and their lack of access to resources. As Orr (1992) observes, the organisation of resource flows lies at the heart of politics: “Who gets what, when, and how much?” (p. 146). While expanding on his views of sustainable use of natural resources, Vuli made direct reference to the South African social-political context, drawing my attention to the relationship between political disempowerment of ‘black’ people (and consequent attitudes towards social authority which he discerned) and issues concerning resource use:

Vuli: Can we divorce the system of environmental education from the broader perspective: how do people perceive the environment? I think in our case, in the South African context, it’s more complex, where you find there are people, a section of the population, who are excluded from decision-making. They are excluded from most things, so that whatever comes from the authorities does bear a big question mark. Even the question of water, that we should use water sparingly, bears a big question mark. As long as it comes from the authority which they perceive as unrepresentative, they will have questions with it. So, I think, in our case, the question of environmental education is going to take a long time, with our people. (DS#1, Vuli, 3)
This way of thinking about one's environment involves a heightened awareness of the pervasive legacies of political policies in all spheres of one's surroundings. Vuli saw “everything” in political terms. Continuing from the above excerpt:

Alistair: Because it has an association .. ?
Vuli: Absolutely. With the whole system of apartheid. For example, in our case, most of the things, if not all of the things, are politicised. Everything is given that political tinge. (DS#1, Vuli, 3)

Given his awareness of, and concern for severe economic impoverishment, Vuli was critical of environmental education initiatives, seeing them as an unaffordable luxury for people who were struggling to survive:

Vuli: What is the use of giving my energy to these environment studies when I do not have a shelter? (DS#1, Vuli, 3)

In similar fashion, Sipho repeatedly referred to the concept of “basic needs” in relation to environmental awareness. When Vuli and Sipho articulated their thoughts on ‘environmental awareness’, they tended to equate it with an awareness and appreciation of nature (as in plants, animals, and natural settings). However, analysis of the content of their discussion on environmental issues revealed that they tended to notice, and be more concerned with, social and political aspects of their surroundings. This seemed at times to contradict their statements on how they thought about ‘environmental awareness’. Sipho felt there were elements of environmental awareness which unavoidably concerned social and political factors, even though this interpretation seemed to contradict what he thought it should involve:

Sipho: This whole question of environmental awareness goes hand in glove with the socio-political dispensation. Whilst you think you should be environmentally aware, there are other issues that sort of dictate against that. Like, the question of needs. There are basic needs, like food, shelter, and clothing. You first have to satisfy those basic needs. Well, it's difficult to
appreciate the nature when you are actually hungry, when you don't have shelter. (DS#1, Sipho, 4)

From a rural area near Uitenhague, Sipho had studied education and Xhosa at Vista University. I had asked him to think of past experiences which likely contributed to the development of his views and he described how he used to obtain water from the single pump in his neighbourhood. During winter this pump often froze up, making access to water even more difficult. In making note of these experiences, the intention is not to account for the way in which he conceptualised environment but, rather, to contextualise his responses. Sipho's experiences of being discriminated against by policies which promoted inequitable access to resources clearly influenced how he thought about his surroundings: he tended to focus on the influences of such policies. His references to basic needs aligned closely with his overall political (or, politicised?) stance, and were described eloquently with respect to the education of ‘blacks’ in South Africa:

Sipho: It comes across nicely: a hungry child will never concentrate in the classroom... If you look at it in another aspect, it's deliberate, given the kind of education that we are studying—the kind of education that Blacks are given—inferior education. The question of basic needs comes across nicely there. These deficiencies in our environments: they are sort of calculated to move consonantly with the kind of education, the inferior education that we get. We are not given food, so that we cannot concentrate, in school, so that we cannot achieve, in order to make food. Then it is the whole question of the cycle. (DS#1, Sipho, 7)

In the content of his responses (but, not in his interpretation of ‘environmental awareness’), Sipho saw close associations between environmental awareness and the extent to which these basic needs were satisfied. At numerous points in the interview, he made associations between social and economic power, and access to basic resource requirements. However, he did not think of awareness of such influences as ‘environmental awareness’. He preferred, instead, to interpret environmental awareness in
terms of a concern for human impact on natural phenomena, such as air pollution. Only if one’s basic needs were satisfied, could one afford the luxury of this sort of ‘environmental awareness’, that is, concern for nature:

Sipho: I see environmental awareness as an essential part of everyone's life, but, as I have mentioned, the ‘haves’ have moved upward in the hierarchy of needs. They have satisfied every basic need, that is why they are so concerned about the environment.

Alistair: So, people who don't have access to such resources are less concerned?

Sipho: Yes, very much less concerned. Well, take for instance: people who don't have electric power. They have to get wood to make fire, especially in winter, or coal, and this pollutes the air, especially in areas like in Uitenhague, where there are squatter camps. In kwaLanga, the shacks, there is this problem. Sort of epidemic things in their environment: dirty water, stagnant right through, sewerage, such things. Where they just want to satisfy these needs, regardless of whether they are contravening these environmental interests. (DS#1, Sipho, 5)

Sipho's environmental awareness, as evidenced in the excerpt above, is best characterised in socio-political terms: the way he thought about environment tended to make him notice political influences on human-nature interactions.

Another consequence of this people-centred perspective, with its explicit focus on political features, was evident in Vuli’s raising for discussion the Table Mountain (Cape Town) kaolin mining controversy as an environmental issue. His point was to question why this issue had received more prominence in the news media than the issue of the heavily polluted air of the eastern Transvaal coal mines. Whereas the former was an issue largely because of the mining operations' likely effects on plants and animals, the latter directly affects the health of people living near the mines. Unlike those who were concerned with the potential destruction of natural habitat (relatively affluent people in Cape Town), the people Vuli was concerned with were economically impoverished and politically disempowered. In a politicised approach, he noted the imbalance in power
relations between those people affected by these two issues. He believed that the needs of the disenfranchised should receive greater attention:

Vuli: So I was wondering, what is happening to the areas where we have the coal mining next to people? Has there been a cry as it has been for kaolin? . . . Now this is very complex, because of the South African situation. I mean, if we do have those double standards, I don't think we will be honest to try and address this whole thing. So if it affects a particular section of the population, then no-one listens, and if it affects a particular section, the whole country will cry. (DS#1, Vuli, 5)

Thus, beginning with a view of environment in terms of interactions between humans and their surroundings, this political conceptualisation portrays a perspective on this interaction. In the excerpts above, Vuli stressed differential power relations between different groups in society which he understood influenced these human-resource interactions. From this standpoint, it would make little sense to avoid considering influences of political policies on these interactions. A core feature of an environmental education experience from this standpoint would, therefore, involve the consideration of interrelationships between social and political policies and access to natural resources.

Another way of conceptualising this interaction is to focus on the natural world: such views are portrayed in the following category, a bio-physical conceptualisation of environment. Vuli's distinction between effects of kaolin mining (on flora and fauna) and the polluted air (on people who have little means of political recourse) exemplifies these different ways of conceptualising environment. These views will invariably align with personal interests. Lara, for example, a graduate in natural sciences from the University of Natal who espoused a strong interest in outdoor activities and conservation issues, described herself as "naturally-oriented":

Lara: I suppose, in many ways, some people are socially-oriented, and I think I'm more naturally-oriented. I suppose those are my areas of enjoyment: more with the natural things, than with social things. (DS#2, Lara, I, 6)
The association between personal interests and interpretations of environment supports the claim that students expressed more than their interpretation of a word in the interviews. In responses to these questions on environment, they drew on personal interests and concerns and espoused a variety of ways in which they related to their surroundings.

**A bio-physical conceptualisation of environment**

Someone espousing a bio-physical conceptualisation of environment would raise issues concerning the effects of human impact on the natural world, such as soil erosion, diminishing biodiversity, and pollution of natural systems. This portrays a way of thinking about one's surroundings where the major focus of attention is the non-human world. In the previous categories, by way of contrast, the focus of interest was on the human world—there was a tendency to notice social and political features and less of a tendency to think about the natural world unless it was directly associated with people's interests.

In response to the question “what does ‘environment’ mean to you?”, Mike had written “the land we live on, air we breathe, this must be protected and cherished”. Raised in Grahamstown and having studied history and human movement, Mike had a keen and active interest in outdoor team sports:

Mike: Protecting the land, the air we breathe. I mean, it's just survival: if it's not there, we cannot live.

Alistair: But, land will always be there?

Mike: The land: it'll always be there, but it won't always produce, if you don't look after it. It won't grow trees where you get your oxygen from, and if it's not protected, or cherished .. you must love something before you will protect it. The land is not just the soil itself, it's the trees, the landscape, waterfalls, that's what I mean by land. So it's just there, it's beautiful. It's necessary. It's life. (DS#2, Mike, I, 2)

The term bio-physical refers to living organisms, such as plants and animals (biotic components of environment), as well as non-living features such as air, water, and
mountains (abiotic physical components). Bear in mind that this categorisation does not necessarily reflect any single individual's understanding: it is made for analytical purposes only. Indeed, in the excerpt above, Mike made a point of communicating his understanding of the necessity to conceptualise these two features in unitary terms.

While human constructions such as roads and factories are also physical structures, an individual espousing a bio-physical conceptualisation of environment would tend to be aware of, and place emphasis and value on natural elements—those which are not derived from human technology. An environmental education program, then, “should attempt to teach people about that which we cannot replace”. When asked to elaborate, Mike began by drawing attention to ways in which he appreciated nature:

Mike: I believe, if you don't love something, you're not going to look after it well enough. It's just .. you just realise you have to have this therefore you must protect it, I mean, I've just got a love for nature. I've been using this word a bit much, but it's just totally amazing to me. (DS#2, Mike, I, 3)

The sorts of environmental issues which Mark raised included concerns for soil erosion, deforestation, and endangered species of wildlife:

Alistair: What about "wildlife" concerns you?
Mike: Well, their living space is being totally diminished: it's just getting smaller and smaller. Man is encroaching more and more and, eventually, you'll just have little game parks scattered about. (DS#2, Mike, I, 4)

The litter of plastic bags, much in evidence on the outskirts of Grahamstown, was a source of considerable irritation to Mike, as they reminded him of humankind's pervasive influences on the natural world:

Mike: It's not natural: it's made, and it's not 'green'. They are strewn all over the place, it's rubbish. It's not how I like to see a place. It's spoilt by man, by us. (DS#2, Mike, I, 4)
In the second interview, I reminded Mark of this discussion on litter, and asked him to elaborate on his response:

Mike: It's not going to disappear that quickly unless someone picks it up, and takes it out of there. That's what I found on that hike; I had my pockets full of stuff that I'd picked up on the trail.

Alistair: Now, why were you doing that?

Mike: Aw, it just looks dirty. Soil doesn't look dirty.

Alistair: But, you don't just walk past it then?

Mike: No. I can't really explain it. It's not natural, it's not a plant, or animal droppings. We've synthetically made the stuff, and just used it and thrown it aside. I can remember doing that in Cape Town as well, picking up papers on the beach. I was walking around picking up chip paper, chucking it in the bins. (DS#2, Mike, II, 10)

These views clearly informed his understanding of appropriate environmental education experiences:

Mike: Well, first, I think you should start in your classroom: get the pupils to see that also in the classroom, you shouldn't see papers and untidy things. (DS#2, Mike, II, 10)

Mike's interest in bio-physical environmental issues persisted through the duration of the interviews. Consider the following excerpt, extracted from the fourth interview (in the eighth week of the HDE program), where he elaborates on his view of environmental education:

Mike: Important parts: just, getting kids to see the truth of what's actually happening. The water pollution which affects us directly, air pollution, that sort of thing. Maybe smaller things that you could do to make your environment, your immediate environment, physical environment, or natural environment better. I mean, like, litter campaigns, and things like that. Just little things, but, to just give them an idea. And I suppose the protection of animal species: the protection of animals. That's also very important. (DS#2, Mike, IV, 29)
In a similar vein, Gavin responded that, for him, “environment is the surroundings. Mostly it's nature, the oceans, veldt, the various animals that live in it”:

Alistair: When you're walking around, what are you aware of in your surroundings?
Gavin: It's mostly the trees, I think. At our school, the only thing we did environmentally, was planting trees. On Arbor Day. That was the only thing we did, I think, environment-friendly. And, when I started reading, what interested me most was the Amazon rain forest. That, and animals. When I think of environment, that's the main thing I think of. (DS#2, Gavin, I, 3)

Gavin described himself as being from “the ‘coloured’ part of Grahamstown”, and he had studied computer science and zoology at Rhodes University. Much of Gavin's knowledge of the natural world was derived from vicarious experiences: largely from his readings, and from watching television programs. Continuing from above:

Alistair: Plants and animals?
Gavin: Mainly trees and animals.
Alistair: What kind of animals?
Gavin: The larger kinds: elephants, rhinos, stuff like that.
Alistair: And, have you seen those..?
Gavin: No, I haven't been to a zoo. I've watched films of them on TV, and read a lot, and that's where I think I got most of my stuff. (DS#2, Gavin, I, 3)

Two environmental issues of concern to Gavin were “the destroying of animal’s habitats which can lead to their extinction” and “air pollution caused by factories”. A strategy he suggested to promote environmental education included excursions to natural areas. However, given financial constraints, he envisaged this to be unlikely, and suggested indirect experiences which would convey the extent of human influence on the natural world:

Gavin: I think the best way will be to bring the environment into the classroom: show them films, slides, stuff like that.
Alistair: “Bring the environment into the classroom”: is that .. what? Films of ..?
Gavin: Of not only surroundings, rural areas, but also of the natural environment, and how something looked before man was there, and how something looks after man was there. Just make them aware of the facts, of what is really out there. How man is really affecting the environment. (DS#2, Gavin, III, 19)

In this excerpt, Gavin indicates an interest in an historical perspective on human influences on the natural environment that emerged in interviews with others. With a degree in the natural sciences and English, Bill had been raised in rural Zimbabwe. In describing his travels to and from Zimbabwe, he offered an ‘eye in the sky’ perspective on ways in which humans were altering natural habitat. The extent of these alterations disturbed him deeply:

Bill: It's constantly in my mind that I'm on tarmac which is spread between here and Shamva, and that there's a border post, and a city, and a couple of large towns, and that there are too many people in the world and that they're a kind of a blot on the place. That doesn't sound very humanist, I know, but the kind of urban situations that we've found ourselves creating since the nineteenth century are creating an ugly world to live in. (DS#1, Bill, 3)

Bill attributed his interest in the natural world to parental influences:

Bill: Maybe I've just been conditioned by a mother who believes in trees, out there, huge expanses of game reserve. (DS#1, Bill, 3)

While social issues may be de-emphasised as a consequence of a focus on human impact on nature, this is not necessarily the case for individual students. Sara's heightened awareness of the bio-physical environment was combined with “humanist” values:

Sara: I'm very into animals, and nature as such, and I'd love to do something with that, on a permanent basis, and that's probably why I went into biology teaching, because it was a way that I could integrate the nature side of it with the helping people side of it. (DS#1, Sara, 2)

Grieg, Pike, and Selby (1989) comment that an anthropocentric worldview presents humans as the principal actors on the planet, with non-human life and inorganic matter
accorded value only in terms of human priorities and needs. With a bio-centric perspective, on the other hand, humans are seen as one form of life among many, and the tendency to be cognisant of the non-human world is much stronger. The difference between focussing on, and being concerned about, the effects of coal mining on people's health as opposed to being concerned about the effects of kaolin mining on flora and fauna illustrates a difference between these views. A bio-physical conceptualisation may include views which, to varying degrees, are less people-centred and perhaps more bio-centric, than the views of those espousing social and/or political conceptualisations.

Consider how Johan described himself in relation to his university peers whom he considered to have a different outlook:

Johan: Some of (my friends) would be interested in, like conserving wild areas, and other chaps just wouldn't care. All they'd care about is just people. . . . I think people are a big threat. I think man is our own biggest enemy. (DS#1, Johan, 1)

Reflecting on how his views seemed to differ from those of his peers, Johan stressed the extent of his concern for issues of human impact on the natural world:

Johan: I suppose I'm a bit of a ‘bunny hugger’, and I think it's about time that these issues got recognised, and got more attention, and got given some clout. That people start recognising, and becoming aware, that it's going to be such a synthetic world that we'll be living in.

Alistair: Do you think people care whether it's more of a “synthetic world”? Johan: No! Some people actually love a synthetic world. They scare the living daylights out of me! That's exactly what I'm saying. (DS#1, Johan, 4)

Conceptualisations of nature emerged during interviews where interviewees chose to speak about bio-physical aspects of environment, for example, nature as pure and unaffected by human impact. By contrast, non-living manufactured objects were somehow tainted by association with their human origin:
Kate: I see beauty in the folds on a mountain range, and in the grain of a piece of wood.

Alistair: Is the wood more beautiful than this plastic?

Kate: That’s manufactured, mass-produced. The influence of an extra shaft of light will have an influence on a sapling that will grow in a certain way because of that. . . . I suppose, it’s part of the balance, whereas that piece of plastic is an amorphous blob. It’s a polypeptide chain that we’ve developed. It’s just manipulated. I find I prefer writing in pencil, rather than pen. (DS#1, Kate, 8)

The term environment has associations with ‘green issues’ and this was mentioned by different students. During the final interview, for example, Jennifer thought of her responses in the questionnaire on the first day of the program, and reminisced on her expectations of the first interview:

Jennifer: Well, when I first heard that I was going to come for these interviews, I remember filling in that questionnaire, right at the beginning. And I thought, you know, I don’t know a lot about ‘ozone-friendly’ and the usual green issues you always hear about. And I thought “Oh, hell, I hope you don’t think I know everything about ozone-friendly products, and depletion of the rainforests, and all that”. (DS#2, Jennifer, V, 48)

In other words, her expectation was that the interviews would be embedded within a biophysical interpretation of environment, and focus on ‘nature’ issues, such as rainforest depletion.

**An integrated systems conceptualisation of environment**

In response to the question in the questionnaire “What do you understand by the word ‘environment’?”, Angela phrased her response in terms of the systems concept:

Environment is the microcosm of our immediate dwelling area as well as the macrocosm of the world and universal system. It includes not only nature, but mankind, inanimate and geological aspects—a whole system of related elements and influences. (DS#2, Andrea)
When asked in the first interview to elaborate on this description, Andrea raised for discussion particular features of her immediate “microcosm”. Social features, such as the social context of her immediate surroundings, received attention first. She mentioned the educational context of the interview, for instance. Having categorised environment in terms of micro- and macro-cosms, Andrea went on to describe how she thought of biophysical features in relation to these social features:

> Andrea: And then, macrocosm is where I think that everything fits. I think the world is a system. A self-regulating system. And, that's where I say, each one of us plays an integral part, but so do the plants: so does everything. You know, without one, the system breaks down. (DS#2, Andrea, I, 3)

Central to this way of thinking about one's surroundings is the concept of system, which may be thought of as an aggregation or assemblage of parts joined in regular interaction or interdependence. Andrea used this concept to help her make sense of her surroundings: it enabled her to consider particular elements, or parts, in isolation, yet also remain cognisant of how these parts were integral components of a larger whole, a working totality. Two major groupings within this system which Andrea tended to notice were the social and the biophysical. At numerous points during the interviews, she chose to raise for discussion elements related to both of these categories. For example, in the third interview:

> Alistair: If you are environmentally conscious, what are you conscious of?
> Andrea: I think your social surroundings as well as the natural surroundings.
> Alistair: Uhhuh. Your “social surroundings”: what's an example of that?
> Andrea: Through your relationships with people, if we can learn respect and interpersonal skills .. respect for each other, which can be brought into classrooms. You know: accepting that people can make mistakes, but that doesn't make them any worse. And then, natural environment is .. knowing that, you're not going to change the whole world, but you can pick up a piece of paper. (DS#2, Andrea, III, 21)
In the absence of explicit reference to the systems concept, one might characterise this conceptualisation as 'social-biophysical mix'. Andrea's responses illustrated a way of understanding the relatedness between social interactions and people-nature interactions by thinking of them as features of an environmental system. She was conscious of the way in which she often raised both of these categories for discussion:

Alistair: When we started off, you talked to the human world, often. Now, what can I infer from that?

Andrea: Basically, my life in Grahamstown, is involved with people: being at university, my friends. Ya, that's how I see it. I would have said it again, I think. I would have included the human side. And yet, I love hearing the sound of crickets. I have got a cricket in my room, and, (laughs) I love it when it suddenly chirps up! (DS#2, Andrea, IV, 30)

Features of her environment which Andrea notices and is especially aware of are other living organisms: mainly people, as well as non-human creatures. However, the excerpt below conveys the theoretical framework which enabled her to conceptualise other forms of life as integral parts of a larger functioning system. In the first interview, when describing what an environmental education program should achieve, she argued that it should extend "beyond emotional issues". The reasons she offered in support of this claim were based on her understanding of the complexity of interrelationships between these system components:

Alistair: You wrote "to care for, and protect and also should extend beyond emotional issues". What's an "emotional issue" to you?

Andrea: I would say 'Save the Dolphins' is an emotional issue. People become emotionally attached to dolphins, and think they're wonderful. I feel the same way, and of course, you automatically want to save just the dolphins, but none of us ever think of the plankton, or things like that.

Alistair: Now, do you care the same about the plankton as you do about the dolphin?

Andrea: Yes. That's what I'm saying: it's emotional. So you automatically think "poor dolphins", but then you are not thinking of the whole system. I was away with people this holiday, and they were collecting insects for study,
and I was thinking, insects form such an integral part of how the whole system works, but none of us have ever worried about protecting insects. You know? People are only too happy if you want to kill them! (DS#2, Andrea, I, 5)

In similar fashion, a systems view underscored a reason she offered for why particular species should receive greater conservation attention than others. Continuing from above:

Alistair: So, you would want to protect them, because they are a part of the whole?
Andrea: If they form an integral part of the system, then, Yes, I think it is necessary.
Alistair: And, if they're not? You put an "if" there.
Andrea: Yes. I think we're going to have to become selective. With overpopulation, we can't preserve everything. But we have to find a balance. And, somehow, preserve those things that are an integral part. (DS#2, Andrea, I, 5)

These understandings of interrelationships between components of different systems are further elaborated in Chapter 5. To conclude, consider the following excerpt, when I was probing Andrea to articulate an understanding of how she thought of ‘elephant’ in the first interview during the ‘Cards’ exercise:

Andrea: I tend to think of them in poetic terms. I think of an elephant's grandeur.
Alistair: Something that's more grand than a big building?
Andrea: Yes. In a sense, definitely. In poetic terms: their beauty, and their worth.
Alistair: Their worth? As tourist attractions?
Andrea: No. In basic terms. As in contributing to the whole system. Soil, plants, everything has its place. But, I don't think we recognise this, and a way of doing this is through looking at the beauty of them. (DS#1, Andrea, I, 9)

Andrea's aesthetic appreciation of the individual creature was informed by an understanding of the creature in its place: her perception of beauty was not solely dependent upon the outward appearance of the elephant. From the standpoint of an integrated systems conceptualisation of environment, biotic and abiotic components are valued because they
are integral parts of a larger system. Andrea acknowledged that this was a particular way of thinking about elephants (that is, as ‘system components’), which was not necessarily widely shared.

Conceptualisation of environment as part of one’s self

Lara articulated a perspective on different ways of thinking about environment by presenting two categories. In the one case, one might consider environment as separate from oneself, “sort of there”. She juxtaposed this description with a description of environmental features as “an extension of one’s self”:

Lara: I think, either you can walk about, and the environment is sort of there, and you can be sort of in it, but you can also interact with it, and that is where the “extension of ourselves” comes into it. (DS#2, Lara, I, 3)

The notion of choice suggested in “but you can also interact with it” implies a conscious awareness of interaction with environmental features—with one’s surroundings. In this instance, Lara chose to describe how her experiences in different locations as well as in markedly different cultural environments influenced her understanding of her sense of self. As she was aware of these experiences and thought about them, they accumulated within her, thereby contributing to her personhood. In this manner, experiences of bio-physical and cultural features came to be incorporated within her. Continuing from above:

Alistair: Interact in what way?
Lara: I mean, just in talking to people. Especially if you travel to a new environment, like down to Cradock, or KingWilliamstown, wherever, that can become your extended environment, by actually interacting with it. That then becomes an extension of ourselves, because it becomes a part of you.

Alistair: How can it become a “part of you”?
Lara: I believe that each person, the way we think and interact, is an accumulation of our past experiences, really. So that extending of ourselves: every time you go to a new environment, it then becomes a part of us, and maybe
makes us more broad-minded, and understanding of different cultures. Like, I’ve done a fair bit of travel to the East (India), and I felt very extended there. (DS#2, Lara, I, 3)

And later, in the same interview:

Lara: . . . maybe in an everyday sense, just really enjoying the environment I’m in. Actually, just straight pure enjoyment, and with that enjoyment, comes appreciation.

Alistair: Can I push you on that “enjoyment”. Why are you enjoying it?

Lara: Because I identify with it. I’ve had so many good experiences. Because, it is a part of me, this interaction thing, it is now part of me because of past experiences. (DS#2, Lara, I, 6)

Lara commented in the meta-interview that she found it difficult at first to engage in the study because her understanding of environment was “something that was very personal .. that you don’t just divulge to anybody” (DS#3, Lara, 2). To her, aspects of environment ‘out there’ became part of her private self, once she had experienced them directly. She held these internalised interpretations of her experiences to be of greater significance than accumulated knowledge alone, such as much of the knowledge gained from her studies. When asked to describe appropriate goals for environmental education, this conceptualisation functioned as a premise, underlying Lara’s understanding of what a program should achieve:

Lara: I think, generally, people need to feel more a part of their world. And that they have quite a strong influence on what happens.

Alistair: Now, how could you try to make them feel a “part”?

Lara: I think, maybe, that comes with sharing experiences with others, perhaps even almost in a survival kind of way. You know, actually making the hikes quite tough, so that each one of them would actually feel important to that group. For whatever reason, even for just helping and encouraging, then those kind of experiences might relate back to the fact that everyone’s important, and we all are a part of things. (DS#2, Lara, I, 4)
Given that experiences contribute directly to one's sense of self, direct experiences of the natural world were absolutely necessary. This way of thinking about environment underpinned Lara's active interest in the educational value of outdoor pursuits, such as hiking, and in experiential education, which she looked forward to promoting in her teaching career.

**Summary and discussion of data analysis for research question 1**

Five conceptualisations of environment were presented and associated in each case with different ways of thinking about environmental education. In effect, students equated the concept ‘environment’ with ‘one's surroundings’. Thus, the conceptualisations portrayed above represent different ways in which students conceptualised their surroundings, rather than different ways in which they thought about the word ‘environment’ alone.

The first conceptualisation framed environment in largely social terms, where interpersonal behaviour in social settings was the main focus of interest in one's surroundings. The second conceptualisation was based upon explicit references to political factors in the South African social environment, with attention given to economic and power inequities among different racial groups and relationships between economic impoverishment and lack of access to natural resources. In the third conceptualisation, attention was focused more directly on the natural world, and on human effects on biophysical features. The fourth conceptualisation portrayed environment in terms of systems theory, as an aggregation or assemblage of conceptually separable parts joined in regular interaction or interdependence. Finally, the fifth conceptualisation presented a way of thinking of environmental features which had been experienced directly as coming to constitute a part of one's sense of self.

The first three conceptualisations portray qualitatively different ways of thinking about environment where the basis of the conceptualisation can be associated largely, if not
entirely, within one of three foci of interest: social, political, or bio-physical. These are
three of four categories which have been used by South African authors to describe
elements of environment (Grieg, Pike, & Selby, 1987; Loubser & Ferreira, 1992;
O'Donoghue & McNaught, 1991), the fourth being economic. The conceptualisations
portrayed above are based upon the content of students' responses in the interviews, rather
than a survey of the literature. None of the student participants in this study framed
environment in largely economic terms.

One should bear in mind that the conceptualisations described above were delimited
for analytic purposes only, that the intention was not to represent any individual's views,
and that the categories are not necessarily mutually exclusive in terms of any one person.
Concerning the latter point, consider Ken's reference to different conceptualisations in his
description of environment:

Ken: Education should make people aware of the world around them, and that
world is not only soil erosion, animals dying off, whatever the case may be,
but also what's happening in the ('black') township. They don't have any
water today because it was cut-off by the authorities—that's
environmental—essentially that is social awareness, what's happening. If
you want to look at environment in terms of nature, you can't really separate
that . . . environment in terms of what people are doing, because the one
affects the other. . . . Maybe also psychological: we live in a world where
our environment also means people interacting with other people
psychologically, and with themselves psychologically, with their own
headspaces. (DS#1, Ken, 1)

Jennifer offered a similarly wide-ranging description in her written response to the
question “What do you understand by the term ‘environment’?”. While she gives weight to
natural features, she clearly wishes to include a variety of elements:

The individual's complete surrounding, including macro- and micro-
environments. It involves personal, social, ecological, spiritual, and
physical interactions. ‘Nature’ seems to be an especially important element in terms of the environment. (DS#2, Jennifer)

Asked to elaborate on this description, Jennifer drew on her studies of psychology to discuss how she thought her sense of self constantly interacted with her surroundings:

Jennifer: Well, “micro” is your immediate environment, the people around you, your home, and then, say, the school, the church, and the nation. The nation is obviously “macro”, but I’m just not too sure where I would draw the line.

Alistair: What other components might you add?

Jennifer: Well, obviously there's the scientific aspect: the molecules, or whatever: I know nothing about science. And then, in psychology, we also did ‘your being in the world’: that essence. Your being in the world: you're constantly interacting with the environment, you're actively participating in ‘being’.

Alistair: “Constantly interacting”? Without using the word environment, what are you interacting with?

Jennifer: Absolutely everything. Everything that surrounds you. Even when you can't see it, you are part of it, because you're interacting with nature, as in everything! (laughs). (DS#2, Jennifer, I, 4)

Similarly, Sandile defined environment as “. . . the surroundings. For example, there are plants, people and animals forming our surroundings and with which we must interact”. When asked to elaborate, his reply concerned largely, but not entirely, the human world of social interaction and political events:

Sandile: If we are here, this is an environment, the people around, in this building, around here, this is the environment of Rhodes University. The buildings, the people: so this is my understanding of the environment. And, I mean, you also have an environment, where there are feuds, there are strikes, boycotts: that's also environment. (DS#2, Sandile, I, 8)

Clearly, some of the excerpts above could have been used to substantiate one or more of the five conceptualisations described in this chapter. The purpose of presenting the excerpts above is to emphasise the point that the five conceptualisations result from an
analytical process which had as its goal the categorisation of students' responses on a collective basis. Issues concerning this analytical process were discussed in Chapter 3 (‘Procedures of analysis’ and ‘Conduct of the interviews’) and are revisited in the overview at the end of Chapter 5.

While the conceptualisations do not necessarily represent any one individual’s way of thinking about environment, one person might ‘spend more time’, as it were, espousing a view of environment in terms of a particular category. That is, a student might tend to think of political features of his or her environment, rather than natural features. This seemed to be the case with particular students. In other words, evidence from the interviews suggested that for some students, issues of the natural world which did not directly concern human well-being were of little relevance in comparison to social or political issues. However, the purpose of the study was not to substantiate such tendencies, or orientations (c.f., Snively, 1986), of particular individuals. Rather, the content of students' responses was analysed with the intent to develop conceptualisations. In the next chapter, which portrays students' conceptualisations of human-nature relationships, the presentation proceeds in similar fashion.
CHAPTER 5

Conceptualisations of human-nature relationships

Introduction

The second research question was presented in Chapter 1 as:

What are some qualitatively different ways in which students conceptualise the relationship of humans to biotic and abiotic components of their environment?

The data for this question was generated in interviews of the first and second data sets by probing students' responses when they discussed a particular way of thinking about the natural world. As explained in Chapter 3, considerable effort was made throughout the interviews to make use of the students' responses to open-ended questions, rather than present them with specific topics for discussion. While the conduct of the interviews is described in Chapter 3, for ease of reference, leading questions and strategies which were fruitful in eliciting students' perspectives are reviewed here:

- In the cards exercise in the first interview, students were asked to arrange and give reasons for their arrangement of the cards: for example, the 'Me' card in relation to cards depicting natural elements (elephant, water, maize, tree, etc.).
- Students were asked to discuss their written responses to the questionnaire; when the content of their responses related to a particular view of nature (or a natural feature or process) these views were probed, generally through asking the student to discuss particular statements. Each interview was transcribed and reviewed prior to the next set of interviews and, where opportunities for clarification suggested themselves, the student was asked to elaborate on his or her intended meanings.
- After the Hobitton excursion, students were asked to comment on their experiences of the excursion as a whole, the overnight 'expedition', their 'solitaire' experience in the forest, and the visit to the waterfall.
In the fourth interview, which occurred in a natural setting, students were asked questions on how they thought about the natural features that surrounded them.

The presentation begins with a conceptualisation of humans and nature in terms of sharing common processes of origin. A portrayal of four conceptualisations pertaining to thoughts on human-nature connections follows. The third category consists of four conceptualisations based upon an understanding of the intrinsic value of nature. Then, a conceptualisation of the inherent value of aesthetic experiences of the natural world is presented. Finally, four conceptualisations based thinking about nature in instrumental terms are described.

**Conceptualisation: Shared origin of humans and nature**

In the fourth interview of the second data set, held in the Botanical Gardens among indigenous vegetation, students replied to the following question:

"We are surrounded by a variety of different living things: we hear birds and insects, and around us are trees, bushes, rocks, and earth. How do you understand how all these different kinds of things, living and non-living, came to exist?"

This question was posed to gain insights into ways in which students account for the origin of diverse forms of life, with the expectation that an understanding of how they thought about the origin of life would provide insights into how they thought about humans and nature broadly.

Without exception, students accounted for the existence of diverse forms of life in terms of sharing processes of origin. In other words, while describing how different forms of life came to exist, they did not differentiate between humans and non-humans: both had come to exist as a result of shared processes. This conceptualisation of shared origin derived from interpretations of scientific accounts for the origin of life, interpretations of theistic-based creation accounts, and a combination of these.
Lara immediately referred to scientific accounts for the origin of life, drawing on concepts such as adaptation, Darwinian succession, and evolutionary change over geological time. Her response was not unexpected, given her undergraduate education in the natural sciences. She had studied evolutionary theory in detail and was familiar with these scientific concepts. Not only did she have a detailed knowledge of evolutionary accounts for the origin of life, she also accepted these interpretations on a personal basis:

Lara: I think, what we see now, is the result of Darwinian succession. Where each thing is uniquely adapted, therefore it survives. So, there are quite strong forces acting on it all the time, like the rocks, and the way they get weathered. I think it's quite interesting to look at it in a sort of dynamic way, as in changing: that there are forces operating on it all the time. That make it continually better suited to living under the conditions of the time.

Alistair: That science way of explaining how this all came about: do you believe that? Do you find that quite acceptable?

Lara: Yes. I'd actually like to look further into the actual starting point, that kind of thing. I see it definitely, in fairly natural terms. It really does make sense to me. You can see it in the weathering of the rocks, and things like that. (DS#2, Lara, IV, 30)

Jennifer, too, invoked a science-based explanation, in preference to a religious explanation, which she explicitly rejected:

Jennifer: I studied Anthropology with evolution and all that. And, religion: I don't have a religion, as such. So, I mean, it's not like 'On the first day this, and on the second day, this was made': I don't think that way at all. I see it just as a natural process: there was an Earth, and things changed and adapted, according to how they had to, and then Man came in. I just see it as a big Earth that adapted and changed accordingly: people and erosion and all those factors.

Alistair: You mention that you see man in all that as well. Is that how you understand how people have come to exist?

Jennifer: Yes. Then, in different areas man has acted in different ways. Like, Grahamstown, has got quite a bit of unspoilt bush. You know, it's a
smaller community, compared to, say, Johannesburg. I mean, you can’t imagine that place as bush or whatever it was.

Alistair: So, the explanation you have in your own mind for how plants and animals have come to exist is no different from the explanation of how people have come to exist?

Jennifer: Yes. We have adapted and changed, the same way that they do, but they do it according to nature, and we do it according to ourselves. We choose: nature doesn’t. (DS#2, Jennifer, IV, 31)

While discussing the subjects he had studied at university (Psychology and Biology) during the first interview, Sandile considered how his studies had contributed to his realisation of the extent of shared features between humans and non-human life:

Sandile: I studied B. Sc., and I do have Psychology 1, and Biology. I also did Biochemistry as well, so I think all those things make you understand yourself.

Alistair: “Understand yourself”? From Biology, you get a knowledge of ..? 

Sandile: What you are, in relation to the other animals. Or maybe, your strength in relation to them. Your similarities in relation to animals. Like, if you learn Biology, for instance, you will see that in the Animal Kingdom they talk about mammals, and Biology is a better way of understanding this. Now, at school we were learning about Human Physiology, which is ourselves, but, the more you compare yourself to these other things, you realise that there are similarities between yourself and the animals which you see running around. (DS#2, Sandile, I, 1-2)

Sandile's biological studies clearly informed his personal understandings of human-nature relationships through increasing his knowledge of the extent of commonalities between people and other forms of life. Gavin, similarly, drew upon knowledge gained from his undergraduate studies in zoology. He understood the process of adaptive radiation to promote co-existence through minimising interspecific competition. Although he conceded to having studied “only a little bit” of evolutionary theory, these scientific accounts informed his understanding of the origin of different life, including humans, on earth:
Alistair: Where do you see yourself in relation to all these different trees and animals, different living things?

Gavin: Like being another part, another organism. Like the tree is another organism, a beautiful bird, just being another organism. The tree is about as different from the bird, as I am from the tree, or from the bird. Like, we are all living on the same planet, we don't have much of a choice. (DS#2, Gavin, IV, 27)

In the excerpt above, Gavin portrays a view of himself in terms of shared features with other creatures, which follow from his acceptance of his interpretations of evolutionary theory.

Sibu’s response to the question on the origin of life, on the other hand, was phrased exclusively in terms of “God’s creation”. Describing his beliefs as “Christian, but not fanatic”, he believed that all living organisms, including humans, were created by God:

Sibu: Well, all that I have is that we are just created. So they are part of creation, as we are all part of creation. I would say, created by God. Maybe someone else would say something else. It all depends.

Alistair: But, for you, it is all created by God?

Sibu: Yes, because of my religion. They have been created by God, to be a part of nature, to exist. As we are also existing. It's one and the same thing: we are all part of God's creation. (DS#2, Sibu, IV, 27)

Within this framework of common creation, Sibu differentiated between man-made things (human artefacts) and natural phenomena. This distinction was made explicit while we discussed his recent experience of visiting the ‘Madonna and Child’ waterfall during the Hobbiton excursion:

Alistair: You refer to ‘Madonna and Child’ as the “Art of God”: that's very powerful. But I don't know how you understand it, when you say that. Now, this table is wood, but it's made into a table. Is it the “Art of God”? 

Sibu: Well, I think this has undergone another process, that has been made by man.

Alistair: Now, does that somehow make it different?
Sibu: I also appreciate it, but I've always had these two streams: things that are man-made, and things that are .. God.

Alistair: And you? Where do you fit in these two streams?

Sibu: Where do I fit? Of course, I am part of man. I am part of man. But I will always appreciate what I think belongs to God, that's just part of it. (DS#2, Sibu, II, 13)

The visit to this waterfall provided Sibu with an opportunity to express a distinction between natural places and features unaffected by humans in relation to human-made artefacts. Underlying his appreciation of the waterfall was an understanding that it was an instance of nature which had not been “affected” by humans. Parts of the natural world which had been used by humans to create artefacts, such as wood for a table, were consequently, less natural:

Sibu: I said that nature, as I see it, is something .. I spoke about the “Art of God”. I say now, nature is not affected by man, but is just the “Art of God”. So that is my appreciation for nature.

Alistair: And the appreciation for nature there: because you understand it to be the “Art of God”, that is somehow a more important appreciation?

Sibu: I appreciate man-made things, but I also have this deep respect for nature, as it is. Because I have always regarded things that are not man-made as things that belong to God. And, I think, with me, they are always beautiful. Well, I even made an example of the ‘Madonna and Child’ waterfall that we saw there, at Hobbiton: even the setting there is very natural and wild. You can see that it isn't much affected by man, or the things that are brought by man, so to speak. (DS#2, Sibu, II, 9)

Remaining with Sibu's “two streams” metaphor ("man-made" and "God-made"), his dichotomy is best interpreted in terms of two currents within a river of shared creation.

Consider the following view which emerged in a subsequent interview:

Sibu: The animals and plants: they have been created by God, to be a part of nature, to exist. As we are also existing ... It's one and the same thing: we are all part of God's creation. (DS#2, Sibu, IV, 28)
When thinking in this context, Sibu considered himself to be a part of nature, partly because he, as a human, is part of God's creation, and partly because of his needs:

Sibu: Well, there we go back to the whole idea, that we were all created, of creation, that we are all created equally... I have said that I value nature because I have this feeling that I am part of nature, and, secondly, this other feeling that I cannot do without this nature. (DS#2, Sibu, IV, 32)

This notion of thinking about oneself as "a part of nature" is developed in the next category. Sibu's comments above support the contention made at the start of this section that conceptualisations of humans in relation to nature may stem from an underlying belief on how all forms of life came to exist. One of the reasons why he saw humans as part of nature stemmed from his belief that humans and the natural world share a common process of origin. Sibu was adamant on this. Following on from the above excerpt,

Alistair: That's a clear distinction there. The one reason is, that you are a part of nature, because of your thoughts, and how you understand God and creation. And, the other part is: 'we need nature'.
Sibu: Yes. For instance, even the paper comes from the tree. And we need this. Even in the future, we will still be needing this.
Alistair: That's the one reason, and the other reason is because of God and creation. Can you think of other reasons?
Sibu: Of any other reasons? No. With me, those are the reasons. (DS#2, Sibu, IV, 32)

Thus, interpretations of a common origin of life provided a basis for Sibu's understanding of how he was related to the natural world. He had mentioned earlier that he, as a human, "belonged to that (natural) set". Humans differed on account of their reasoning power:

Sibu: But, to enjoy the whole beauty of nature, and to have that feeling of being a part of nature, we have to go far away from town.
Alistair: So, town is not really part of nature?
Sibu: With me, it is not part of nature. It is man-made.
Alistair: Ya? Do you feel a part of nature?
Sibu: Yes, I am a part of nature.
Alistair: How do you see yourself a part of nature?
Sibu: Well, I will have to identify myself with everything that is there, in nature. There are birds, animals, there is everything .. I am also a part of that. You see, I am a human being, but I still believe that I am part of those animals .. I actually belong to that set. So that, I have more reasoning power than the animals. So, that is actually what makes me differ from the animals.
(DS#2, Sibu, IV, 26; emphasis in original)

Based upon his understandings of the origin of life as being created by a supreme deity, Sibu recognises a commonality between himself and nature. Beliefs of human common-ness or shared-ness with other forms of life and the natural world are considered in the next section dealing with conceptualisations of separateness and connectedness. In this ‘common origin’ category, religious-based views have been associated with science-based evolutionary views in order to elaborate a conceptualisation of humans and nature in terms of shared-ness. Whether one believes that all life was created by a supreme deity, or evolved through a process accounted for by Darwinian or neo-Darwinian evolutionary theory, the basis for believing in an underlying shared process of origin still holds. Some students incorporated both scientific and religious explanations in their responses.

Andrea referred to both scientific and spiritual-religious interpretations and went on to indicate her difficulties in aligning these seemingly contradictory beliefs:

Andrea: I actually haven't thought about this for so long! Umm, I definitely believe in some sort of evolutionary process.
Alistair: Have you studied that?
Andrea: No, not much. I don't really know what started it all off, because when I was young, I was always just told that it was God who brought all this about, but my views have changed. I think the Big Bang theory works, to a large extent, but I think there's more to it than that. And I do think there is some kind of spiritual realm, but whether that's .. I don't believe in a God-figure. That's just what it's all about. I can't actually say how it all relates.
(DS#2, Andrea, IV, 26)
These statements reveal an acceptance of, on the one hand, scientific interpretations of the origin and existence of forms of life and, on the other, of a "spiritual realm". While Andrea accepted a scientific account of the origin of life, she considered "there is more to it than that". That is, she faced an ongoing struggle in making sense of these beliefs. While she would undoubtedly find it to be very difficult to explicate her understanding of this spiritual realm and its significance, these tacit understandings remained meaningful and important to her. Further, Andrea's understanding that humans shared the same process of origin with non-humans provided a premise for her subsequent discussion on how humans were becoming increasingly alienated from the natural world (described later in this chapter).

Sandile voiced a similar mix of scientific and religious views in his account of the origin of life, and added a further dimension by drawing on Xhosa beliefs in the power of the spirits of one's ancestors:

Sandile: So, I would think that they were created by God. They should be around. Following the knowledge which I have gained: I have studied science, and in science we talk of evolution. And, we also have Christianity, that we have been created by God. Right? So, God created everything which is on earth, he created people—I mean, man as well. Then, I'm a Christian as well, but, I'm not a strong believer, I would say. To me, I believe that there is .. you see, in our culture, we believe that there was someone superior that created man. And though it's not mentioned in our culture, he created us.

Alistair: This is not utixo, this is .. ?

Sandile: Yes. Qamata. So, in our culture, we also believe in, without mentioning it, izinyane, that is, the dead. We cannot forget about them, that is 'write them off'. They are there, they are living, they are there to protect us.

Alistair: This is through your ancestors?

Sandile: Yes, ancestors. And, when sometimes, maybe you didn't know how you escaped a certain thing, but you thought that 'I didn't know how I did that', right? I would say 'my ancestor helped me'. Or, sometimes, you would say, 'God helped me', now that in our culture, we know about God. So, in our culture, we use these: ancestors, power, and God interchangeably. So, there's a bit of confusion really, which one it is: it depends on your person,
and 'who do you really believe in?' So, for me because of the science in my education—the evolution—and because of the knowledge of God, which I have come also to learn, and because of the knowledge of my ancestors. (DS#2, Sandile, II, 14)

The religious beliefs of the Xhosa may involve veneration of a supreme deity (referred to as Quamata, or uDali), lesser deities, and one's ancestors (Miller, 1979, p. 98; Tyrrell & Jurgens, 1986). In the excerpt above, uTixo refers to the Christian conception of a supreme deity.

While a supreme deity is considered to be ultimately responsible for making the heavens and the earth, and bringing forth the people and the animals (Miller, 1979), much of the veneration is reserved for one's ancestors. Miller (1979, p. 98) claims that the conception of ancestor worship was of great significance in traditional Xhosa culture: offerings are made not to an aloof and impersonal god, but to the departed heads of the family, who remain interested in them as individuals and relatives. Sandile acknowledges his own acceptance of European-derived beliefs in a Christian deity, western scientific interpretations on the evolution of different forms of life, and in the power of the spirits of his ancestors: in other words, a blend of beliefs which can be associated with different cultures. These beliefs convey a deep-seated understanding of continuity of oneself with previous generations of humans. Rather than indicating continuity with other forms of life, however, these beliefs are human-centred. While humans and non-humans were created by the same deity or deities, subsequent to this shared origin, the focus of attention was clearly on humans as distinct from the rest of the natural world. These comments introduce approaches to thinking about humans as connected to, or separate from, the natural world.
Conceptualisations of human-nature connections

In the first interview of this study, Ken offered an overview of human-nature relationships in terms of two broad categories:

Ken: There are maybe two kinds of people: those who, when they see, or when they are in nature, feel a great deal of affinity with it, and those who for whom nature is just there. It's pretty, but it's not just something they would be particularly concerned to engage with.

Alistair: Engage? In what way?
Ken: Well, sort of living it. I have a friend who's deeply into hiking, and he lives .. his mental space is lived in nature. Even when he's not in it, he's thinking it. My mental space is generally in this office, or thinking along those lines. . . . So, nature is part of my headspace, but much less than his. (DS#1, Ken, 3)

Kate, too, offered a dichotomous overview of ways in which people seemed to consider themselves in relation to the natural world:

Alistair: You wrote, for environment: “conditions of man with nature”?
Kate: I think lots of people divorce man from the environment. I mean, ozone-unfriendly plastic only has to do with the outdoors, it has nothing to do with man. People don't connect the idea that man and ozone-unfriendly plastic are in fact undivorceable. People don't feel that the environment is part of them. (DS#1, Kate, 6)

As discussed earlier, the procedure adopted in the interviews was to encourage students to speak on human-nature relationships broadly, and then probe responses which implied a particular view of this relationship. Kate's statement “people don't feel that the environment is a part of them” is an example of such an instance. Continuing with the interview:

Alistair: And how do you “feel” that you are “a part”? What are other ways in which you can express that?
Kate: Well, I suppose when I walk on a piece of grass, I see that it's going to do it damage, and that I must tread lightly. It's just the way. The eland has to
tread too, but the eland follows certain paths, and if it's not quite to its own
'movie', the eland will take a different path. You see? I try to follow my
instinct. (DS#1, Kate, 6; emphasis in original)

Again, my intention in these interviews was to encourage students to articulate aspects of
this instinctive, tacit knowledge. As this section will demonstrate, Kate espoused views on
human-nature relationships which showed that she understood herself to be intimately
connected with the natural world.

Turning to a way of thinking of humans as separate from nature, Sara believed that
whereas humans were clearly a part of nature in some cultures and that this had likely been
the case in her own culture in the past, this was no longer so. Sara understood a notion of
humans as separate from the natural world in terms of culturally-influenced “ways of
seeing”. This accounted for how some people saw themselves as completely separate from
the natural world:

Sara: If we lived a very rural life like, say, Bushmen—and I'm not saying that we
must go back to that, either—but if everybody lived a life like that, then
nature would be part of the culture. But it isn't in our case.
Alistair: Is that how you see most people are separate from the environment?
Sara: Because it's not part of their culture.
Alistair: So, we're all part of our environment, because we eat and drink, and
breathe, but we're not part of our environment, because .. ?
Sara: We don't see our environment as being a part of us. Because, if you look
at, say the Bushmen: they believe that. For instance, they're careful about
what they do, and they give back to the Earth as well. (DS#1, Sara, 8)

Sara's overview of types of human-nature relationships relates closely to
perspectives which have been developed in eco-philosophical literature. Evernden (1993a),
for example, contends that a sense of separation which individuals conceive to exist
between themselves and bio-physical features of their environment is an adversary of
appropriate environmental thought. This is the main area of interest in this category: on
ways in which students considered themselves connected to, or separate from, the natural world.

One may refer to understandings of connectedness from at least two different perspectives: 'science-based', for want of a better term, and 'psychologically-based' (Fox 1990). Whereas the former is based upon acceptance of empirically-derived knowledge (e.g., humans are connected to the air, because we need oxygen), the latter is based upon an understanding of "a sense of self that extends beyond one's own egoic, biographical, or personal sense of self" (Fox, 1990, p. 198). In this section, the focus is not on conceptualisations of self, or on conceptualisations of nature per se—which Cobern (1993, p. 937) refers to as "the NonSelf, that is, all that one distinguishes from oneself". The focus, rather, is on how students conceptualised the relationship between humans and nature in broad terms.

For some students, an understanding of humans as 'psychologically connected' with the natural world made little, if any, sense and such perspectives were not evident in their responses. On occasions, the usefulness of the distinction between science-based and psychologically-based categories was limited. For example:

Alistair: So, you sense some sort of relationship between you and animals?
Kate: Absolutely! Everything. In a physical sense, Newton saw it: he saw that a particle had a relation to every other particle in the universe, just as my molecules do with that computer. There's a physical relationship between them, just as there's maybe a psychological relationship between them as well. It might be in the form of a wave, something physical, or . . . I don't think I believed, ever, that things weren't related. (DS#1, Kate, 6)

Kate refers above to scientific knowledge which informs how she sees her own physical and psychological self as being intimately connected with bio-physical features. She went on to speculate on other possible ways in which she understands herself to be connected to, that is, to be a part of, these natural features. In effect, such perspectives collapse the distinction made by the terms self and nature, as some students espoused.
conceptualisations of self as very much a part of nature. This is a particular way of conceptualising one's sense of self in relation to natural features, however, and it is the purpose of this section to portray students' conceptualisations which resemble such perspectives, as well as other perspectives on self in relation to nature.

In overview, this section describes ways in which students understood themselves (and/or humans) to be connected with nature ('feeling a part of' nature/bio-physical features), on the one hand, and separate from nature ('feeling apart from' natural features) on the other. Further distinctions have been made within this frame. Within the category 'conceptualisations of connectedness', science-based and psychologically-based conceptualisations of connectedness are portrayed. A section portraying conceptualisations of separateness is presented between the two above categories. This apparently mixed order was adopted because some of the excerpts which illuminated this way of thinking (i.e., separateness) also described ways of conceptualising how humans were becoming increasingly alienated from the natural world, and how this process of alienation could be addressed (partly through psychological means). Rather than 'chop' the excerpts in the attempt to portray these categories in a different order, the different ways of thinking are presented in a manner which retains the flow of the students' responses and which juxtaposes one category against another.

Conceptualisation: Science-based connections with nature

Many students espoused a science-based views of connectedness between themselves and physical phenomena, such as air and water. These are described as 'science-based' because students drew on scientific knowledge in order to establish and illustrate the connection. In the following example, Gavin describes how humans are "linked" with other creatures because both share a requirement for oxygen. He rejects other possible ways in which one might think of humans as linked:
Gavin: We are all part of the earth. We are all living on it. So, we are all linked together in some way, even if it is just by the need of oxygen. Most things anyway: there are some exceptions.

Alistair: Are there any other ways in which you think we are linked?

Gavin: Except for staying on the same planet, being on the same planet, and almost co-existing, but not quite. No. (DS#2, Gavin, IV, 27)

During the fourth interview, while sitting under a tree, I asked Siyanda what “a pattern that connects” meant to her. This was a line of a song which students had sung in the environmentalism presentation the previous week. She offered a science-based view of how she as a person was connected with biophysical features such as rocks:

Siyanda: I am in a way connected to things like this rock, because some of them have minerals, and some of them will weather in the long run, and they will form soil. And soil is the basis of life. (DS#2, Siyanda, IV, 22)

While describing her thoughts during the ‘solitaire’ in the forest, Gail described how she appreciated time spent in such settings because it provided her with the opportunity to gain a perspective on her activities in the city. When thinking about problems she was facing, she found that it was helpful to be in natural settings as she was able to remind herself that she was “just a little part of all this”. Although she had not studied science since her schooldays, her understandings of ecological interpretations of nutrient cycling through natural systems informed how she thought about herself in relation to the forest. In this sense, she could feel as though she were a part of the forest. As she had rarely talked about these thoughts before, she found it frustratingly difficult to put them into words:

Gail: A part of the system. In the same way that all the animals exist. I . . . I don’t know! (laughs) OK, I don’t know much about this, but when you first start doing ecology, in about Standard Four, they show you a cycle. And they usually draw a tree: a sort of ecological cycle, how things decompose, and things eat them. That kind of thing. I kind of feel a part of that, like a part
of the system, that works, and if you play your part right, I think you can keep the system going. It's a good system. (DS#2, Gail, 6)

One may conceptualise one's self being connected to the natural world, being a part of it, as a result of shared processes of origin with other living creatures (as described earlier). In the final interview, Sibu included an understanding of common origin on the basis of shared evolutionary processes (although, subsequently, he admitted to having a limited understanding of evolutionary theory, having never studied it in detail):

Alistair: You also said that you are “a part of nature”, and that you cannot do without it. And I was interested: in what ways do you see yourself as a part of it? I think you have spoken of this before.
Sibu: Yes, well I said that. Because, anyway, we are part of nature. I think the only difference there is that we are more rational beings. Anyway, we are just the same in other things: we came about through evolution, it's only that we are more rational beings. That's what makes the difference between us and other things.
Alistair: And we are the same because we all came about through evolution?
Sibu: Yes, and through creation, if you will. They both explain this for me.
(DS#2, Sibu, V, 40)

**Conceptualisation: Humans separate from nature**

Conceptualisations of separateness in a sense other than physical location are evident in the following excerpt where Andiswa discusses her arrangement of the cards:

Andiswa: I have combined these together (man, woman, child) because they relate to each other, then I have combined these together, here, because they are animals.
Alistair: Which are quite separate?
Andiswa: Yes, they are quite separate. Then I have related ‘road’, ‘tree’, ‘mountain’, ‘river’ together.
Alistair: Why do those relate together?
Andiswa: They are a part of the environment, then these are the things that we need in order to live, then those are animals, part of the environment, things that we need, and that's what each home comprises. (DS#1, Andiswa, 4)

This excerpt conveys elements of a social conceptualisation of environment, where features of one's surroundings which receive most attention concern social interactions. The natural world provides the necessary materials and serves as a backdrop to this social world and humans 'connect', that is, interact, with this natural world through use of resources. Other than acknowledging its instrumental value, however, the natural world is thought of as separate from one's environment—one's social surroundings. It receives little psychological attention: in Ken's words, presented at the start of this section, “nature is just there. It's . . . just not something they would be particularly concerned to engage with.”

This way of thinking about nature is anthropocentric and instrumental in that nature is viewed in terms of human needs. Value is ascribed to the non-human world largely, if not entirely, in instrumental terms—whether the “things” are useful to humans. In Vuli's case, for example, parts of this natural environment which do not directly affect humans and which are of no instrumental value, are thought of as having little significance. In this sense, the natural world is thought of as separate from, and not a part of, one's surroundings:

Vuli: I think the society that one lives in does have an effect as far as one behaves in the environment, and to be quite frank, in our own 'black' society, if I may distinguish, we don't really bother ourselves about the environment. . . . I'm referring to the forests—natural environment, because there are a lot of arguments where people would say: “What is the use of nature?; Why do we need to appreciate nature?”. (DS#1, Vuli, 2)

Humans may also be conceptualised to be separate from nature partly as a consequence of how people treat nature. Gavin thought that the extent of humanity's effects on nature was excessive. His concern for the scale of human influence on the natural world appeared at numerous points during the interviews and underscored his belief
for why (and how) humans had become separate from other living creatures. Gavin believed that humans were no longer part of nature, although they were in the past. These beliefs emerged in the first interview, while he was discussing his arrangement of the cards:

Gavin: Elephants are part of the animals, and, they do damage to trees, it's true, and the environment. It's a part of nature: some destroy, some build up. But not on a large scale like man.

Alistair: So man's different there?
Gavin: Yes.

Alistair: Do you see man as "part of nature", then?
Gavin: No, not really.

Alistair: "Not really"? What does that imply?
Gavin: It implies a bit, because, we are of this world: we are part of the Earth, but, not part as the animals are, who live in the natural environment. He's on earth, and that's it. But he's not really part of it, I don't think.

Alistair: So, it's just a physical presence?
Gavin: A physical presence, Yes.

Alistair: Whereas, an elephant or an insect?
Gavin: Are more part. They have their particular niche, which they occupy, and we don't. We seem to go all over the show. Each has got its place, and only affects some of the other animals. Man seems to affect everyone. (DS#2, Gavin, I, 8)

Two weeks later, when asked to elaborate on these statements in the second interview, similar views emerged:

Alistair: You mentioned that, when we were doing those cards, you said that "insects and eagles were more a part of the Earth than humans are". What did you mean by that?

Gavin: I probably meant the environment: the forest, natural environment. They're a part: they make part of the natural environment, which I don't think humans really do. They are part of the ecosystem, more so than humans. Humans disturb them most of the time. (DS#2, Gavin, II, 10)
In the past, however, humans had been “a part of the natural environment”:

Gavin: At one stage, man was part, I would say. Early man. When we weren't so many. But, nowadays: there's environment, and there's man.
(DS#2, Gavin, V, 35)

For Gavin, then, modern humanity was separate from the natural world, mainly because of the extent of human imposition on the natural world. As an individual, however, one could attempt to ameliorate the extent to which one was estranged from the natural world, through actions which consciously attempted to minimise these human impositions. As discussed in the description of psychologically-based conceptualisations of connectedness, Gavin considered that one could try to “think you are a part of” nature and, in doing so, diminish the extent of this separation, or feeling of alienation. These feelings of alienation are developed in the following category.

**Conceptualisation: Humans becoming alienated from nature**

While acknowledging the existence of science-based connections between people and the natural world, some students considered that modern society was becoming increasingly estranged from the natural world. Elements of this view have appeared in the excerpts above. These discussions provided insights into how students believed humanity was engaged in a process of becoming separate from the natural world. In her first interview, Andrea described this process of alienation in terms of modern society's decreased contact with nature. She was concerned with what she saw as a growing intellectual detachment from nature:

Andrea: And we actually depend so much on that, although we've alienated ourselves so much from it.
Alistair: How do you see you've “alienated” yourself?
Andrea: I think, in general, modern society alienates itself. Well, first of all, through urbanisation: we're not in contact with nature in that way, but also, we've intellectualised ourselves, and we think about theories, and
interactions, but we don't actually think about how we depend on our primal needs. We still need to get food from the land—whether we buy it from the shop—we still depend on the earth, but I think we've alienated ourselves from that connection. I certainly don't often think about the whole system, and where everything's coming from. I mean, you just go to the shops, but I think it's important to raise our awareness. (DS#2, Andrea, I, 4)

A “particular environmental concern” of Andrea's, which she had mentioned in her questionnaire response, was a “disparity of wealth”. Andrea's concern for both social as well as natural features of her environment was also apparent in her explanations of this process of alienation. When asked to elaborate on her comments above in the second interview, Andrea interpreted alienation in terms of separation from both nature and from other people:

Andrea: I think in a lot of areas, we just tend to think of ourselves as success-based. You know: you go to school, so you can get a degree. We're not really relating it to some bigger picture: 'Why this is all happening?'. Just going to school, so you can get into university, so you can get a job, so you can earn money, so you can have a family.

Alistair: And, what are some tentative answers for you?

Andrea: I think, mainly, it's developing our potentialities as humans, which involves caring for other people, as well as our environment, and for ourselves. I think we're social beings, and so a lot of importance is overcoming separateness from other people and from environment. But, I think it's becoming difficult in modern society, where things are so technologically-based.

Alistair: How can you try to go about that?

Andrea: I think, just by trying to form authentic relationships. Which means having to reflect on yourself, and how you related to people, and what you're doing to the environment, anyway. And then, by having a sense of responsibility. (DS#2, Andrea, II, 12)
Again, in the fourth interview, when asked for her sense of the phrase “a pattern which connects”, included in the song mentioned earlier as part of the environmentalism presentation the previous week, Andrea described ways in which she thought people were becoming alienated both from nature and especially from other people—one's social surroundings:

Andrea: I think it has to do with what I was saying earlier, about this alienation of man from environment. And, concern for the environment has to become part of our everyday life. That's the “re-connection”, I think.
Alistair: Sorry, by “environment” there, you mean?
Andrea: Everything: natural, but, cities are a part of our life, and they have to be. But, people as well. If we have more responsibility towards each other.
Alistair: This is all part of that “re-connection”?
Andrea: Yes. Because I think we tend to alienate ourselves from each other, as well. People are very .. we don't get involved, we don't tend to see other people suffering. All of us know that in the township, there is a lot more suffering going on, but, how much do we actually do for the beggars in the street? It's too uncomfortable for us to have to face up to the suffering, but I think, that's the “re-connection”. That we actually have to give more, and face up to what's happening around us, and be aware. (DS#2, Andrea, IV, 27)

In a previous discussion on her vegetarian eating habits, Andrea mentioned her growing awareness of and opposition to the “mass slaughtering of meat”. The practice of mass slaughter was no longer part of a natural process. Whereas killing animals on a small scale for need was ‘natural’, the sheer scale of modern operations meant that this practice could no longer be considered natural. Indeed, this slaughter contributed to a “destructive ethos”, which countered Andrea’s views on the need for respect for both social and natural environmental features:

Alistair: And, why are you opposed to that “mass slaughtering”?
Andrea: Because, I no longer think that it's part of a natural sort of process. Before, a few heads of cattle were kept, and then were slaughtered. Obviously, in an industrial society, we can't, but animals are now specifically bred just to be
slaughtered, and it seems to be a mass slaughtering which is killing some sort of energy. It's just a sort of destructive ethos. It's no longer part of the cycle of life, where the animal lives, and has fulfilled its purpose in raising young, whatever. They are actually just bred purely just to be killed. And it just seems to be very destructive. (DS#2, Andrea, III, 21-22)

Acting on these views, Andrea had made a personal decision to no longer participate in this particular “destructive ethos”.

While discussing her arrangement of the cards, Jennifer had alluded to socialisation as a process which resulted in an increased separation between humans and nature. In the second interview, I reminded her of these statements:

Alistair: You also mentioned that “babies would be included along with the natural grouping, but beyond a certain age, because of the socialisation process, they would join the ‘Me’, ‘community’ grouping, hence become more separate”. I’m interested in this enlarging gap.

Jennifer: As the baby becomes older, it becomes more separate from nature. I think it’s the nature—nurture controversy. From the beginning, its natural instinct, and then that moves along, by socialisation.

Alistair: How does it become “further along”?

Jennifer: It’s influenced by those around it: its parents, its habitat.

Alistair: Now, in a broad sense, are people part of nature?

Jennifer: Yes. Definitely. People, the person. Not what their values have become, or their interests, but the person: especially the baby. (DS#2, Jennifer, II, 14)

When I probed Jennifer to elaborate on what she meant by “separate”, she mentioned “being drawn away”, “losing touch”, and “becoming foreign”. She mentioned a few acquaintances who she considered were engaged in this process of being drawn away to a greater extent than herself. She also described how she would go on daily walks along a nearby beach, partly to keep in touch with both natural features and her private thoughts. Sara too described how children differed from adults in terms of their lack of exposure to widespread beliefs and practices, which invariably resulted in them “becoming hardened to the importance of nature” in their lives. Nature was less foreign to children than it was to
most adults. In general, adults were more destructive and hurtful to other creatures, in comparison to younger children, who had yet to acquire widespread beliefs on human-nature relationships:

Alistair: You see children as different somehow?
Sara: They haven't had all the damage done, they haven't been indoctrinated. They're still at the stage when you can show them that they can have an effect on the environment. They'll do something about it: they'll go and clean up a river, or something. Whereas once they've had 30 years of people telling them but it's someone else's problem once you throw it away, once you pollute the river, and once it goes down further, it becomes someone else's problem—it goes into the sea and you'll never see it again—then, they become hardened to that sort of thing. They don't really care, they're busy making money, and they're busy trying to stand on someone else's head, so things like nature don't seem to play any important roles in their life. So, while they're young you can still get to them and .. train them right! (DS#1, Sara, 7)

Conceptualisation: Humans psychologically connected with nature

In his written response to the questionnaire, Bill offered a description of environment as:

"The macrocosm that we, as microcosms exist in. We are part of the universe. We, too, are the environment: if we pollute it, we commit untold violence on ourselves." (DS#1, Bill, 1)

In response to my question on which parts of the universe he saw himself to be a part of, Bill's reply indicated a strong interest in bio-physical features of his surroundings:

Bill: When you wake up in the morning, there's the sun shining, trees, leaves, birds singing in the trees: that's the way it should be. (DS#1, Bill, 2)
Implicit in many of Bill's statements during the interviews was the stance that if he believes he is a part of the natural world then 'it', conversely, is a part of him. Hence, when humans inflict damage upon the natural world, they inflict damage on themselves.

Some students alluded directly to a psychologically-based sense of connection of themselves with biotic and abiotic aspects of their environments. For example, in an excerpt which has already been introduced in this chapter, Kate draws on a variety of sources to support her view of how humans were intimately bound to the natural world:

Alistair: So, you sense some sort of relationship between you and animals?
Kate: Absolutely! Everything. In a physical sense, Newton saw it: he saw that a particle had a relation to every other particle in the universe, just as my molecules do with that computer. There's a physical relationship between them, just as there's maybe a psychological relationship between them as well. It might be in the form of a wave, something physical, or... I don't think I believed, ever, that things weren't related. (DS#1, Kate, 6)

Kate's response to the card-sorting exercise, following some 10 seconds of thought, was to scoop all of the cards together into a jumbled pile. By this action, she communicated her understanding that the various categories were interrelated, and her unwillingness to separate each category.

These beliefs relate closely to ways of thinking about humans in relation to nature which Devall (1988) considers to be a major theme of deep ecology: the wholeness and integrity of person/planet. They also relate closely to the concept of a psychological sense of identification, as reviewed in Chapter 2, which is based on an expansive conception of self. That is, a conception of self “beyond one's egoic, biographical, or personal sense of self, to include an identification with other beings and processes” (Fox, 1990, p. 198).

In the following excerpts Sara describes how she sees herself in relation to the animals she had raised for discussion:

Sara: (I see myself) as an intruder. I find it very frustrating that when I try to get close to (antelope). They run away. They're scared of me, and I've never
actually done anything to harm them. As much as you try, it's very difficult: you're always just an outsider and, you represent humankind, and humankind is messing it all up. (DS#1, Sara, 5)

Sara used the concept of “merging” to explain how she attempts to diminish the separation which she feels exists between herself as a human being and other living creatures, regardless of her personal disposition. To Sara, “merging” involves both physical and psychological aspects. In terms of the latter, it requires “almost a conscious effort”:

Sara: You, for yourself, are almost becoming a part of the environment. You're casting off human-type traits almost, and you're sort of naturalising. I suppose, you're coming closer to nature. . . . It's almost a conscious effort: you've got to sit there and wait for them to make the first move almost. You can't go to them: you've got to wait for them. Even on the farm, I used to go and lie down on the field. If you just stand there, the cows just all go away, but if you lie down, they get inquisitive and they'll come up to you and start licking you.

Alistair: And have you actually done that?

Sara: Ya, Ya. They're very inquisitive. I love cows! Even with more or less tame animals, you have to first get their trust. (DS#1, Sara, 12)

This excerpt reveals that Sara has devoted considerable thought to the relationship between herself and other animals, to the extent of having enacted those thoughts.

Sara’s thoughts about how she related to other creatures also informed her views of promoting environmental awareness:

Sara: If you take the kids on hikes, then, you can teach them an awareness of nature. If you just bash on through a forest, you're not going to see anything, whereas, if you sit down in a forest, you're almost certain to see birds, and animals. You've got to make the effort, the animals aren't going to: they'll run if they hear you coming, so you've got to be quiet, and you've got to become part of their environment. (DS#1, Sara, 12)
Similarly, while talking about his experiences during the solitaire activity during the Hobbitton excursion, Gavin believed that he could try to “melt into” the forest, and so become more a part of it:

Gavin: You can try to think you are part of the forest.
Alistair: Uhhuh? How can you “think” .. ?
Gavin: To be .. Aw, it’s difficult to explain.
Alistair: Ya. It’s an interesting idea though. Do you think you were trying to be “a part” while you were sitting there?
Gavin: I tried. Yes, I think I did try to melt into the forest, to be as quiet as possible: to observe what is around you. Not to make any noise. (DS#2, Gavin, II, 10-11)

During the fourth interview, in the Botanical Gardens overlooking the university and Grahamstown (“that world down there”), Jennifer discussed how she saw herself “fitting in” when needed. This process of fitting in required both time and mental effort:

Jennifer: I see myself fitting in when I need to. My life is so busy, and it’s so contained in that world down there, that, I don’t have a chance to actually think, to consciously think about myself fitting in here, until I feel like I need a break from my world down there. And, then when I do that, then I see myself very much fitting in. But, I don’t consciously think about it the whole time. (DS#2, Jennifer, IV, 33)

While she may not “consciously think about [fitting in] the whole time”, Jennifer is quite clear on how she does think about fitting in, or connecting, with the natural world.

In an earlier interview, Lara had described how the natural environment was in some ways “sacred” to her. When I asked her to elaborate on this, she described how she needed to spend time out of doors, because she found it “easier to relax and be at peace”. It was not necessary to travel away from the urban area where she lived: the place was not as important as the “mindset”, and time spent out of doors, in the presence of non-human life, was precious to her because it encouraged her to “connect with the natural world”: 146
Lara: I think, just being aware of nature, and, you know, getting almost that feeling that we are a part of everything. It's quite humbling in a way. You sort of realise: "Well, the sun's rising, and the birds are singing, and life goes on" kind of thing. You know? "Whether I'm there or not". And I am only a small part of it all. It's not so important where you are, as your mindset. Like, Anne Frank's Diary saying: "as long as you have a patch of sky". That makes sense to me. As long as there is something to connect with the natural world. (DS#2, Lara, V, 38)

Lara's response in this excerpt conveys the extent to which she values moments when she senses herself to be a part of the natural world. It is important to her that she senses herself as "part of", or intimately connected with the natural world, over and above science-based connections. She discussed the significance of these thoughts a few minutes later, after I had asked her to describe what she had implied when she referred to interconnectedness as "the truth, really":

Lara: It's sort of quite a humbling thing. If we see the links, you know, that we are only part of a chain, or a web, or whatever. And that in itself can be quite a .. Ya, a spiritual thing. Because there's a connection there. You've established a link, you've made a connection. And just realising it.

Alistair: Sorry: what are you meaning by "spiritual" there?
Lara: I don't know .. spiritual: I'm not really sure about spiritual. But, it's sort of .. uplifting, somehow, if you can call it that. Because, I suppose again, it's looking at ourselves, not as the be-all and end-all, but in relation to other things. And, I think, if you see yourself in that kind of niche, sort of that you are only a part of the picture, you can somehow relate better to what's all around you, in many ways. (DS#2, Lara, V, 40)

Lara describes above how she thinks of herself as embedded within and undoubtedly part of the natural world. Moments of realising such thoughts are of considerable significance to her. Given her scientifically-informed knowledge of the complexity of natural systems, these thoughts for her are both humbling and "uplifting". Further, these thoughts inform how she acts (at least, how she thinks she should act) in relation to the natural world.
These ethical perspectives were clearly informed by her ecological knowledge, in particular, by her firm belief in what she described as “the truth of interconnectedness”. Flowing from these beliefs was a respect for nature. Continuing with the interview:

Alistair: “Relate better”?
Lara: Relate as in, either just pure appreciate. Or, use better. Or whatever, but there's some proper relationship. I think, you just have a far greater respect for other things. Which is very important.
Alistair: And that respect derives from your own realisation that .. ?
Lara: Yes. That interconnectedness. That everything that we see around us plays a part in the overall picture, and we need to recognise that.

(DS#2, Lara, V, 40)

This concludes the portrayal of ways in which students conceptualised how humans were related to the natural world broadly: the conceptualisation of common origin and conceptualisations of connectedness and separateness described above portray ways of thinking about humans in relation to the natural world at large. The following categories of description portray ways in which students attributed value to non-human organisms or entities.

**Value-based conceptualisations of nature**

The attribution of different senses of value to non-human organisms and entities was apparent in students' discussions of how they thought humans should act in relation to the natural world. Approaches to thinking about human-nature relationships based upon the concept of value have been organised using three categories employed in environmental ethics, namely intrinsic value, inherent value, and instrumental value. As Armstrong and Botzler (1993, p. 53) comment, there is often disagreement on the meaning of these terms. Some writers, for example, use ‘inherent value’ and ‘intrinsic value’ interchangeably, whereas others distinguish between them. Fox (1990), for instance, uses only intrinsic and instrumental categories. In the following presentation of students' value-based
conceptualisations, the use of these categories is justified in each case, on the grounds of remaining faithful to the students' intended meanings.

**Conceptualisations of intrinsic value**

While discussing how humans should interact with nature, some students attributed the existence of rights, based upon a concept of intrinsic value, to organisms or entities other than humans. While no student actually mentioned the term 'intrinsic value', the excerpts will illustrate that this inference is fair. Beliefs in intrinsic value formed the premise of their statements on why people should treat the non-human world with respect: because non-human organisms or entities possess these rights, they deserve to be treated in a respectful manner. Excerpts of students' statements are used to portray different ways of thinking about human-nature relationships where each conceptualisation rests on an understanding of intrinsic value of nature (or non-human creatures, or entities, as the case may be). Four qualitatively different ways of thinking about the intrinsic value of non-human organisms and entities were evident in the students' responses. These have been labelled according to the criteria which students recognised as providing the basis for the intrinsic value: awareness-based, life-based, ecosystem-based, and God's purpose.

As the example below illustrates, some responses comprised elements of more than one conceptualisation. In his first interview, Sibu alluded to two conceptualisations of intrinsic value, based upon the criteria of awareness and life, as reasons for why he thought animals should be treated with respect. In the following excerpt, Sibu presents elements of both conceptualisations in his response to my probes: in the first section of the excerpt, he refers to sentient properties of animals (that is, their capacities for sense perception), and in the second, to a life-based ethical perspective:

Sibu: Even the animals, they've got soul, they can feel pain, and all those things. I think it's not wise. For instance, animals, they breed just like us, they feel pain just like us. Because when you hit a dog, it will scream.

Alistair: And, when you see a dog or other animal in pain, you feel ..?
Sibu: Well, I don’t feel happy. I think they have a right to exist, and a right not to be tortured.
Alistair: Why would they have that right?
Sibu: If they did not have that right, they would not be existing. That’s what I think. So, we exist, because we have a right to exist. Everything we see here, has a right to be here, because it exists. (DS#2, Sibu, I, 6)

All students understood that humans had intrinsic value, and that this value conferred rights upon humans. Thus, humans should treat fellow humans in a manner which was respectful of those rights. The following presentation portrays different ways in which students attributed the existence of intrinsic value to different forms of life.

Conceptualisation: Awareness-based intrinsic value

Advocates of ethical sentientism propose that an appropriate criterion of moral considerability is that of sentience, that is, the capacity for sense perception (Fox, 1990, p. 163). If a being is sentient, so the argument goes, then it may be said to have interests, including avoidance of suffering. These interests are intrinsic to the being; that is, they do not depend upon whether the being is useful or not for human purposes. As Sibu stated in the excerpt above, living beings have intrinsic value because they “feel pain, just like us”.

During the interview, Sibu explicitly rejected my suggestion that the value of particular forms of life was conferred by humans: he was adamant that non-humans possessed these rights.

Similar views were apparent in many of Jennifer’s responses. In one instance, she described how she thought about geckos, small reptiles which she often encountered in her home. While she was unable to discern how they might feel pain, she was nonetheless convinced of their ability to do so:

Jennifer: They’re all over inside our home: many of them! And I could never harm one, ever! I’d put it nicely outside.
Alistair: Now, why not?
Jennifer: Never! No! They are alive, and they have feelings. But somehow I can't get into their way of feeling hurt, and pain. They would, but I can't imagine it for myself. Maybe it's their eyes. You can see their expressions.

Alistair: You almost give them a human trait?

Jennifer: I think, in a way, they are very much—I know this is silly—they are very much like human beings except they don't have that higher intelligence. They can't reason, and that's where I see them being more vulnerable, and having more right to having their freedom, and treated with respect, than us. Because we can fight for what we want, or what we believe in. They can't. (DS#2, Jennifer, II, 10)

A conceptualisation of geckos as, in Jennifer's words, "very much like human beings" is undoubtedly anthropomorphic. However, the point here is that this view of these creatures is associated with strongly-felt beliefs about the ability of some animals to sense pain and suffering.

Jennifer subsequently articulated a view about the concept of rights which provided a basis for her aversion to instances of animal abuse. In the final interview, she described how her experiences as a participant in the study had consolidated her views concerning the rights of living creatures "not to be imposed upon". She also described how these beliefs translated into her actions regarding other creatures:

Jennifer: It's making me think about why I feel this way. And, I think I've developed a new concept. I mean, I've always had that heartfelt sympathy for something, but you don't ever think 'Why?'. And now, Yes. It's a violation. I see it more as a violation than I did before. Rather than just the sympathy.

Alistair: A violation of .. ?

Jennifer: Of rights for living things.

Alistair: You think of it in terms of rights?

Jennifer: Yes. Definitely.

Alistair: What do you understand by a "right"? There are different view of rights.

Jennifer: My strongest right, I think, is not to be imposed on, by something, or someone else.

Alistair: Uhhuh. How do you come to have that right?
Jennifer: I think every living thing that comes into the world has the right not to be imposed on. I hate being imposed on!

Alistair: Now, something, say, like animals that we eat?

Jennifer: Yes, that is a definite imposition.

Alistair: I'm just trying to push you on a view here: So, do you eat them?

Jennifer: Very, very occasionally. Never here. At home. It's conflicting because, when I do quickly eat something, I won't think about it. Like, when I eat a ham roll, I'm not thinking, you know, 'This is a pig'.

Alistair: But when you stop and think about it?

Jennifer: Yes. That's why I can't walk near the meat counter: I could never go and buy a steak. I see it as, you know, what it is. (DS#2, Jennifer, V, 46; emphases in original)

Jennifer recognised that the extent to which she was concerned about cruelty and abuse of animals distinguished her from her family members. In the following excerpt, for example, she discusses her increased awareness and concern for issues of animal welfare over political issues. Similar to her last statement in the previous excerpt, she portrays these differences in terms of ways of “seeing”, or thinking about, non-human creatures which causes people to treat them differently:

Jennifer: Like when I'm walking with my father, and we are very close. You know, he won't notice a lost dog. He'll say “stop it” to me, but I'll take it home, and feed it, and phone its owners from the number on its collar, and he'll think I'm ridiculous! And then, he's horrified: he thinks I'm so ignorant, because I don't know who Buthelezi [political leader] and all these people are. I wouldn't see something that he would see, and vice versa.

Alistair: What gets to you about cruelty?

Jennifer: Little things. I mean, even my sister: her poor dog. It's just so unfair: it doesn't have a choice. And, I don't think people see. Like her dog, it's basically solely a guard dog. It's got a big garden, and it gets fed every day. But, no one plays with him. They don't take it for walks anymore. She just sits there and has to bark if someone comes near the gate. They don't see .. she cannot see Amy as being lonely and bored. You know, when you walk past, and the dog jumps up at you, it's like “Sit down!”
and “Get out!”. They don't see it as having feelings.
(DS#2, Jennifer, V, 44; emphases in original)

In response to my question on why he thought it was important that animals such as elephants should be preserved, Gavin described how he believed that many animals were aware of their captive situation. He made a clear distinction between animals held in captivity in a zoological park, and those allowed access to more space in relatively natural settings:

Gavin: One in the zoo has been taken out of its natural environment. I don't think it can be that happy, being caged up. In a reservation or wildlife park, it's better: they've got space, they can live. Not free, but in the natural environment. Although there's boundaries to it, that's better than the zoo. You're taking away someone's .. somebody's .. something's freedom.
Alistair: It's almost sounding as if it's human, with its “freedom”, and its feelings?
Gavin: It does, doesn't it.
Alistair: Is that how you see animals like elephants?
Gavin: Although they've got, not the brain capacity able to think like we do, I think they do still realise they are not free anymore. I think that's a concept most organisms have: freedom. In some way or another. (DS#2, Gavin, IV, 29)

In the above excerpt Gavin qualifies the awareness-based argument to include concern for a form of psychological suffering. In his view, given that other mammals are capable, like humans, of being aware of their surroundings, it follows that humans are obliged to respect that awareness and treat them accordingly.

**Conceptualisation: Life-based intrinsic value**

While discussing her arrangement of the cards, Gail had mentioned her experiences of seeing elephants in natural settings in Zimbabwe. While she struggled to elaborate her views in response to my question on why she cared about elephants, she was firm in her belief in an intrinsic value of living creatures. In Gail's view, non-human creatures had value simply because they were living: the criterion of ‘life’ provides the basis for this
conceptualisation. Given this intrinsic value, humans should treat non-humans with respect:

Alistair: What do you care about elephants?
Gail: They are living.
Alistair: And, what's special about that?
Gail: I don't know! You respect life: other forms of life. OK, if it's a usable thing, as much as I don't like to see animals killed, as much as it upsets me, I think that if it's necessary, I would kill it and eat it. I'm not a vegetarian either. But I feel that when it's just for a kick, then it's wrong. Maybe it's just an inherent thing, that it's wrong to kill. (DS#2, Gail, 5)

Later in the same interview, when asked to elaborate on why she cared about ozone depletion, a topic she had mentioned a few minutes before, she based her response again on the premise of “respect for life”:

Gail: Because I like living, and .. (laughs) I like the world! I think the world is an incredibly beautiful place. I think it's a marvellous system. I don't know! It fascinates me: I have a great deal of respect for it. (DS#2, Gail, 6)

In these excerpts, and at other points during the interview, Gail conveyed her belief in the ethical position that living organisms deserve to be treated with respect simply because they are living. Her beliefs resembled what Schweitzer (1964, in Armstrong & Botzler, 1993) referred to as the basic principle underlying his essay on the ethics of reverence for life: “it is good to maintain and to encourage life; it is bad to destroy life or to obstruct it” (p. 343). Gail did not draw upon awareness-based arguments to support her position.

As stated, this argument for intrinsic value is tautological, and Fox (1990), drawing on recent biological thought on distinctions between living and non-living systems, discusses how this criticism is only superficially valid (pp. 165-176). However, the aim here is not to refine a philosophical argument, but to portray elements of a way of thinking about human-nature relationships as conceptualised by students. Life-based ethical
arguments which reject sentience as a proper criterion for moral considerability have been developed in the literature. The point here is that elements of these arguments were evident in Gail's responses, as indicated above. In that excerpt, Gail also alluded to a systems-based conceptualisation. This way of attributing value to nature is developed below.

**Conceptualisation: Ecosystem-based intrinsic value**

In the final interview while we were discussing his previous statement that he did not see humankind as part of the environment, Gavin mentioned how he would never drive a vehicle over the sand dunes of a beach near Grahamstown, even though he had seen other people do this. He strongly resented these actions. Gavin saw his resentment as an instance of his being "conscious of nature", and indicative of his belief that he should try to minimise his impact on natural features, where possible. I probed him on the link he was making between his beliefs and his likely actions and his reply drew upon a blend of ecosystem-based and life-based intrinsic value arguments. Concerning the former, he understood the sand dunes to be more than an assemblage of living organisms and non-living components. The sand provided a habitat for these organisms and they in turn constituted an integral feature of the stability of that habitat. In this sense, the two were inseparable parts of an ecosystem. These perspectives were woven into his response:

Gavin: Because you can avoid it. If you want to. And if you avoid doing destructive things like that, that's on the plus side: you don't hurt anything. Or environment, habitat.

Alistair: What do you mean "hurting it"? Your actions don't necessarily have any tangible effect.

Gavin: Not on me, No. But for the organisms, animals that live there, it will. Think about driving a 4-wheel drive bakkie [truck] over the dunes: so what? But then, you destroy the plants there, that keep the dune in place.

Alistair: It's interesting that you are expressing a concern about that. I've certainly seen people who don't have that concern, and I'm trying to think, what's the difference here? Is it in the way the two of you see those dunes? So, now, how are you seeing it?
Gavin: Seeing it as not just organisms, but as a habitat, for organisms. Seeing it as it has its own right to be there, because of the plants. The plants have got the will to survive, and if they can survive in that area, then you don't have the right to go and destroy it. Because if you think of it, those dunes are not very favourable positions to be for life. (DS#2, Gavin, V, 35)

Gavin was concerned with harm inflicted upon both diverse forms of life as well as the dune habitat as a whole. In terms of concern for the latter, Gavin's beliefs accord closely with Aldo Leopold's land ethic, as reformulated by Heffernan (in Fox, 1990): “A thing is right when it tends to preserve the characteristic diversity and stability of an ecosystem or the biosphere. It is wrong when it tends otherwise” (p. 176). And, as will be apparent in the following excerpt, belief in these ecosystem-based rights was significant in other respects for Gavin. These beliefs provided a basis on which he differentiated between those people who recognised the rights of other living creatures and systems to exist without unnecessary disturbance, and those people who did not acknowledge these rights.

Continuing with the discussion above, I challenged Gavin's position supporting the rights of plants by pointing out how little support this way of thinking about plants would likely receive in public. He agreed and went on to develop this perspective by arguing that views widespread in society contributed to humanity's growing separation from the natural world:

Alistair: You talk about “rights” there. And for a lot of people, to hear someone talking about rights of bushes in a sand dune, they'll think: “Ag, No man!”.

Gavin: Yes, I know. And, that's why I don't think that humans are really a part of the environment. Because most people think that way. “So it's a plant, So what? It doesn't have any rights”.

Alistair: Whereas, do you see plants as having some sort of rights?

Gavin: Yes: the right to live, to exist, the right not to have somebody come and trample all over you. (DS#2, Gavin, V, 35)
In the latter part of the discussion above, Gavin describes his belief in the inherent right of beings to survive, in a context of viewing them as members of the community of interdependent parts of the dune ecosystem. It is not necessary that such beings are aware of their interests (the criterion of sentience), for these interests to be taken into account in the context of actions regarding them. As Fox (1990, p. 166) argues, this view does not deny the moral relevance of sentience; it simply denies that sentience is an appropriate criterion of considerability.

Conceptualisation: God's purpose-based intrinsic value

At the start of this Chapter, a conceptualisation of the origin of all forms of life in terms of shared processes was portrayed. For one of the students in particular, the fact that humans share numerous features with other forms of life was all the more significant because he believed that all life, having been created by a deity, was an expression of that deity's purposes. Hence, all forms of life were imbued with intrinsic value as a consequence of their creation by a deity. This way of understanding how humans originated in relation to other creatures provided a basis for Sibu's belief that he should treat other creatures with respect. That is, he saw these creatures as having intrinsic value, and that this value influenced how he should act towards them. Elements of Sibu's views were consistent with perspectives subsumed within a 'cosmic purpose ethics' category in Fox's (1990) typology. Fox describes this as a broad category referring to a variety of approaches that have in common the proposal that,

... in addition to humans, some or all non-human entities are considered to be morally considerable by virtue of the fact that they in some sense embody or are expressive of some kind of cosmic interest. These approaches generally rely upon views about the ultimate ends of evolution or the nature of God or God's purposes. (Fox, 1990, p. 179; emphasis in original)
No student espoused an intrinsic value of nature arising from a view on the ultimate ends of evolution, but two students described how non-human entities had intrinsic value because they were expressive of God's purposes. In the final interview, I encouraged Sibu to think of an example where his actions were consistent with these espoused beliefs. He drew upon his belief in the creation of the natural world by God, as well as an ethical perspective based on sentience, as reasons why he would not cause animals to suffer unnecessarily:

Sibu: For instance, I have never ill-treated animals, because I don't think that it is wise to do so. That is my belief.
Alistair: I'm sorry, what do you mean by “wise” there?
Sibu: I mean, I don't think it is correct to ill-treat animals, because they are part of God's creation. And, they have soul, they have blood, they feel pain just like us. (DS#2, Sibu, V, 41)

In the previous interview, while responding to my question on how he thought of himself as connected to other living creatures, Sibu offered two reasons for why he valued nature. One was a belief in instrumental value, and the other was an encompassing belief in intrinsic value:

Sibu: Well, there that we go back to the whole idea, that we were all created, of creation, that we are all created equally... I have said that I value nature because I have this feeling that I am part of nature, and, secondly, this other feeling that I cannot do without this nature. (DS#2, Sibu, IV, 32)

Sibu's belief in intrinsic value had emerged in the first interview. Although in that case I had missed the opportunity to probe his beliefs underlying this perspective, as the following excerpt indicates, it was a belief which made more sense to him than an instrumental perspective alone:

Alistair: Now, some people say that animals have a right only if they are useful to us, that they have value only if they are useful to us.
Sibu: You mean, only if an animal is useful to us, does it have value? For instance, if an animal is not useful, we..
Alistair: Should be less worried about it.
Sibu: “Should be less worried about it”. Hmm! Well, that's the way they think. Well, I would just disagree with that. (DS#2, Sibu, I, 6-7)

In the light of Sibu's understanding of how all living things came to exist, being creations of a deity, they all have intrinsic value because they are expressive of God's purposes. In hindsight, a limitation of the interviews was that a likely hierarchy of intrinsic value—with humans presumably occupying the top position—was not explored. Nonetheless, this particular way of thinking about humans and other living creatures constituted an important theoretical platform underlying how Sibu believed one should act in relation to the natural world, drawing as it does on his firmly held religious beliefs.

Conceptualisation of inherent value

As discussed earlier, there is often disagreement on the use of ‘intrinsic value’, ‘inherent value’ and ‘instrumental value’: some authors maintain distinctions between these categories whereas others collapse them. Three value-based categories were used to organise students' responses, for two reasons. Most importantly, the concept of inherent value conveys the flavour in which students conceptualised a sense of aesthetic appreciation of nature. This will become apparent in the conceptualisation describing an aesthetic appreciation of nature, below, if one bears the following descriptions in mind. Frankena (1973) describes inherent values as referring to “things that are good because the experience of contemplating them is good or rewarding in itself” (p. 82). Armstrong and Botzler (1993), similarly, describe inherent value as “value which requires the presence of a valuer who can appreciate the object of experience” (p. 53). A second reason for using this category is that there is a consensus emerging in environmental ethics which sustains distinctions between it and the other two (Armstrong & Botzler, 1993, p. 53).
Conceptualisation: Aesthetic appreciation of nature

In a written assignment on the ‘Hobbiton experience as environmental education’, submitted in the week after the excursion, Sibu claimed that his experiences in the natural surroundings and the interest shown in the (natural) environment over the weekend had prompted him (and, as he claims, his colleagues) to think about the natural world:

For many of us, the opportunity was a sort of awakening from a deep sleep because we had never thought much about the environment before. . . . We became observant of the nature aspects of environment. One was also able to start appreciating the beauty of nature, for instance, the ‘Madonna and Child’ waterfall. (DS#2, Sibu, written submission)

The concept of “appreciation”, specifically aesthetic appreciation, is explored and developed here.

The term ‘aesthetic’, coined in 1750, is based on the Greek aisthetikos, meaning sense perception (Armstrong & Botzler, 1993). Armstrong and Botzler (1993) describe an aesthetic experience as differing from other forms of experience in several ways. Perhaps most importantly, it requires “. . . an interest that is non-practical and non-utilitarian. Aesthetically, an object is valued for its own sake, rather than for its potential use” (p. 104).

This category portrays a way of thinking about and valuing nature that is qualitatively different from appreciating natural settings as, for example, a tranquil escape from one's social setting. On the other hand, Fox (1990) places aesthetic appreciation within the bounds of instrumental value theory. That is, the non-human world ought to be preserved on the basis of its importance as a source of aesthetic pleasure. One might argue, for example, that the ‘Madonna and Child’ waterfall should be preserved on the basis of its importance as a source of aesthetic appreciation. In one sense of this argument, the waterfall has instrumental value in allowing one to attain an experience of well-being. This sense of valuing natural settings is contained within the conceptualisation ‘Therapeutic
value of nature’, which is presented within an instrumental value-based category. However, while discussing how they appreciated the beauty of natural settings, students' responses focussed on the natural features, rather than on what that experience was doing for them. The focus was on contemplation of the beauty of the natural setting, rather than on the benefits they may have been deriving from that contemplation. A conceptualisation of aesthetic appreciation, therefore, conveys a less overtly instrumentalist valuation than a conceptualisation of natural settings as therapeutic in that they promote a sense of well-being.

Siyanda described how her appreciation for nature had only begun since she started her university studies and gained access to a variety of educational sources. In the final interview, I asked her to describe this dawning appreciation:

Siyanda: Well, it started here at Rhodes. Otherwise, before then, I just didn't consider nature as something even existing.

Alistair: But, you knew about it from books and TV, and ..?

Siyanda: Well, I wasn't interested. And, I didn't have access to books before I came to Rhodes. I didn't have books: we had very very few. I don't remember seeing a book with things of nature. I just saw novels. I don't remember reading a book with nature, which introduced me to nature. (DS#2, Siyanda, V, 26)

In the fourth interview on the hill, when asked to describe “what she could see that she liked”, Siyanda chose to discuss the difference in the number of trees between the ‘white’ and ‘black’ areas of Grahamstown. Whereas many lush green trees were visible throughout the former area, including the centre of the city, there were few, if any, in the ‘black’ areas. This situation reminded her of her childhood in the Transkei region where, having had little experience of trees, she had viewed them solely in use-based terms as sources of firewood. She was beginning to see trees differently:
Siyanda: The ‘white’ area is very nice, and there are all trees around, but if you can see the township, there are very few trees. And even, where I grew up, I didn’t really know the significance of having trees next to the road.

Alistair: You didn’t care about them?

Siyanda: Yes. Because I was not really exposed to that kind of lifestyle. Well, there were very few trees in the Transkei. They were only in the forest. In between the houses, there were very few trees. The only importance of trees that I knew was for getting wood, for firewood.

Alistair: Whereas now?

Siyanda: Well, now, I think they beautify the place as well. (DS#2, Siyanda, IV, 19)

She offered a similar aesthetic experience of the ‘Madonna and Child’ waterfall which we had visited during the Hobbiton excursion. In the final interview, I handed her a photograph I had taken of some of the students at the waterfall, and asked her to describe her response to the place:

Siyanda: I was just thinking of the waterfall. Just appreciating the waterfall. It was quite beautiful, a beautiful view. I was enjoying looking at the waterfall, because I didn’t have.. in my life, I wasn’t able to go to the waterfalls. So, I was just enjoying looking at it. (DS#2, Siyanda, V, 28)

These experiences at the Outward Bound Centre provided some students with their first direct experience of natural settings relatively undisturbed by humans. Like Siyanda, Sibu had never previously seen a waterfall in such pristine surroundings. His appreciation of natural phenomena was enhanced by his belief that these phenomena, having been created by a deity, represented the ‘Art of God’. The reason he offered for why a natural setting such as the waterfall should be preserved was an aesthetic one, based upon his religious beliefs:

Sibu: I have always regarded things that are not man-made as things that belong to God. And, I think, with me, they are always beautiful. Well, I even made an example of the ‘Madonna & Child’ waterfall that we saw there, at Hobbiton: even the setting there is very natural and wild. You can see that it
isn't much affected by the man, or the things that are brought by the man, so to speak.

Alistair: And so, it's important that a place like Madonna & Child be preserved?
Sibu: Well, I think so, especially just for other people, just to see the beauty of nature. Because these things are actually perishing: they are disappearing now. (DS#2, Sibu, II, 9)

Andrea articulated a form of aesthetic appreciation while I was encouraging her to describe how she thought of ‘elephant’ during the Cards exercise in the first interview. After describing how she appreciated the beauty of elephants, she explicitly rejected the suggestion that this beauty was contingent upon their value as tourist attractions:

Andrea: I tend to think of them in poetic terms. I think of an elephant's grandeur.
Alistair: Something that's more grand than a big building?
Andrea: Yes. In a sense, definitely. In poetic terms: their beauty. In basic terms, as in contributing to the whole system. Soil, plants, everything has its place. But, I don't think we recognise this, and a way of doing this is through looking at the beauty of them. (DS#1, Andrea, I, 9)

Andrea's aesthetic appreciation of elephants was enhanced by her understanding of these creatures as integral contributors to a larger natural system. In other words, her aesthetic appreciation of these animals was informed by an understanding of their place in a natural order.

The influence of ecological knowledge on aesthetic response has been described in the literature. In an essay on Leopold's arguments, Callicot (1993) demonstrates how Leopold's perception of aesthetic beauty was self-consciously informed by his intimate knowledge of ecological and evolution biology. Indeed, Callicot argues that Leopold's ecological literacy predetermined his perception of natural systems and phenomena. Just as experience informs thought, so thought “equally and reciprocally informs experience” (Callicot, 1993, p. 153). In Callicot's words, “the ‘world’, as we drink it in through our senses, is first filtered, structured, and arranged by the conceptual framework we bring to
The excerpt above illustrates that Andrea's perception of beauty was not solely dependent on the outward appearance of elephants. Her perception of the beauty and worth of these creatures was enhanced by her thoughts about them in their habitat, as "contributing to the whole system". From the perspective of an integrated systems conceptualisation of environment (Chapter 4), biotic and abiotic 'parts' are valued because they are integral parts of a larger system. In this manner, an ecological and systems-based way of thinking deepens one's aesthetic perception of the natural world—elephants in this case. Ecological knowledge, among others, "penetrates the surface provided by direct sensory experience and supplies substance to scenery" (Callicot, 1993, p. 153). Acutely aware of the importance of cognition in how one sees, perceives, or thinks about the natural world, Leopold (1949) argued that the job of promoting aesthetic appreciation of nature was “a job not of building roads into lovely country, but of building receptivity into the still unlovely human mind” (p. 177). As the excerpts above indicate, elements of such an informed receptivity were evident in some students' responses as they described how they experienced the natural world and/or non-human creatures.

**Conceptualisations of instrumental value**

As reviewed in Chapter 2, a major collection of ethical arguments is based upon the view that while humans have intrinsic value, the non-human world (and its parts) is valuable only when it is seen to be valuable to humans. As Fox (1990, p. 149) explains, from this standpoint the only kind of value the non-human world can have is instrumental—if it serves as a means to human ends. Students incorporated various instrumental value theory perspectives in their ways of thinking about the non-human world.

An hierarchical view of relationships between 'man', 'woman', 'child', and natural features was apparent in Andiswa's arrangement of the cards as well as in her interview.
responses. She began by describing why she had arranged the cards in a linear order on the table, from left to right and beginning with ‘man’:

Andiswa: A ‘man’ is the head of the house, then comes a ‘woman’, then ‘child’... The woman has rights, but she is under the man, like the child is under the woman. (DS#1, Andiswa, 4)

As far as animals were concerned, however, Andiswa stated that “we control them: they are under our control”. She believed that humans had rights, but did not attribute a concept of rights to other forms of life. Indeed, toward the end of the interview she refuted my suggestion that animals might have intrinsic value. She believed, rather, that their value was determined by their usefulness to humans. That is, she believed that the non-human world was of value only in instrumental terms, because of its usefulness for human purposes.

The following instrumental value-based conceptualisations of human-nature relationships are portrayed below: custodian/preservationist, wise-use of nature, and therapeutic value.

Conceptualisation: Custodians and preservationists of nature

Johan, raised on a farm and with a strong interest in the natural world evidenced in experiences such as guiding tourists in remote wilderness areas of southern Africa, actually volunteered himself to be interviewed for this study. He volunteered because he was highly enthusiastic about the study's environmental interest and wished to contribute by promoting his views. Wilderness areas, he believed, held great potential for eco-tourism. Johan considered his role in the relationship between himself and animals, including “primitive” humans, to be that of a custodian, intent on preserving wild animals and natural settings. This role was articulated, for example, during a description of his arrangement of cards:

Alistair: How are you connected to ‘elephant’, ‘insect’?
Johan: The only way I'm connected to them is basically just trying to preserve, watch over. . . . There are enough people growing 'wheat', making 'roads', 'babies', that type of thing, but there are not enough taking care of these chaps (pointing to 'elephant'), who can't take care against us.

(DS#1, Johan, 3)

Further views consistent with the notion of a preservationist role emerged in Johan's description of a discussion he initiated with pupils during his teaching practicum at a local 'white' school. He had been describing to the class one of his visits to northern Namibia as a tour guide, during which time he had come across desert-living people:

Johan: The people living in the (Kaokoveld) reserve, the Himbas, they've been there for millions and millions of years: they're still like Bronze Age people. We stopped and I thought: 'I've got to give these guys something'. So I gave them a potato, and this guy just started eating it raw. He didn't even know what a potato was, or things like that, you know? Still primitive. They're so much part of the landscape. So I was asking (the pupils, in class): "What do you think should happen? Should this be camped off as a reserve, and the people re-located, or should people stay there?" I was asking them what their ideas were, and obviously you got ideas varying from "You should shoot a few" to.

Alistair: "Shoot a few .. ?"
Johan: People, you know.
Alistair: Who was advocating this? The kids?
Johan: Ya. No, No, just their answers, you know.
Alistair: Why would they suggest to "shoot a few" ?
Johan: Well, basically just .. like if you're going to camp it off, just to keep the numbers down. But then, we'd discuss it. "This is serious"; "Why are you thinking like this?"; "How can you do that?". (DS#1, Johan, 3)

The above excerpt contains inflammatory statements which must be considered in the South African context of forced removals of disenfranchised people, a policy which was widely implemented during the apartheid years and, in relation to this case, during the development of some 'national' parks (Weekly Mail, 30th October 1992, p. 14). The legacies of these
removals and associated demands for recompensation are sensitive issues in the current political situation. The (‘white’) pupils' suggestions are included in this excerpt, in an attempt to communicate how these perspectives, while morally outrageous, are consistent with the notion that in order to conserve reserves in a ‘natural’ state, management practices are required. Johan's response to my probe “why would they suggest shooting?” is to refer to the rationale for standard game-management procedures adopted in most southern African reserves, and apply it to humans. While he goes on to indicate the problematic nature of these suggestions, which he seriously encouraged the pupils to re-consider, these statements are included here to communicate preservationist beliefs that humans must protect “parts of the natural landscape” in their pristine state, such as game reserves, even if such protection necessitates management practices which may have severe social consequences. That such perspectives are given credibility as the subject of debate in classrooms is indicative of socio-political values which have long characterised ‘white’ South African society. If one is able to consider these views in isolation from racist values, however, Johan's comments indicate an anthropocentric perspective of the human-nature relationship in association with a bio-physical conceptualisation of environment. Showing a keen interest in nature, he saw his role, and that of other concerned environmentalists, to be one of custodian and preservationist of the non-human world.

**Conceptualisation: Wise-use of nature**

A widespread and common way in which humans value the natural world is in terms of resources, that is, in terms of how organisms, materials, and processes are valuable for human use. As Livingston (1981) comments, resources “do not exist in and of themselves; they become. The moment we see usefulness in something—anything—that thing becomes a resource” (p. 16; emphasis in original).

Sandile's comments during the fourth interview, while we were sitting under the shade of a tree, provide an overview of how he had “been taught to think at school about
trees”: essential as a fuel source, they are especially important in winter for warmth. These instrumental perspectives pervaded his discussion in the interviews. Mostly, he thought of the value in terms of use to humans, and he also recognised that a variety of creatures used trees, in this instance, for their own purposes:

Sandile: What do I think of it? Most of the time, you think of the tree in terms of what you have been taught at school: what you can do with the tree. Like now, we are having shelter, under this tree, and you think: we can make fire. You can collect some wood, and the branches, and make fire. And, also, I know there are some living organisms in the tree, like small insects.

Alistair: It's not only people which use the tree?

Sandile: Yes, it's not only people. Insects as well use the tree. What else can I think of? The trees can also prevent... they are windbreakers. If you plant them, they are windbreakers. (DS#2, Sandile, II, 15)

Underlying a ‘wise-use’ way of thinking about human-nature relationships is the knowledge that many resources exist in finite quantities. Hence, one recognises that unrestrained resource extraction may lead to depletion in the long-term and that one's interests are best served by restrained exploitation. In other words, careful and organised use of a resource is prudential, thus necessary. These statements capture Vuli's views on “the kind of relationship that humans should foster with the natural environment”:

Alistair: What kind of relationship, do you think?

Vuli: To conserve the environment. As much as we benefit, but I think we need to do things that we don't regret at the end of the day. That whatever we do to the environment, it should not hit back to us in the long run. I think that's what I had in mind. (DS#1, Vuli, 1)

Vuli went on to indicate how his teaching practice would convey views of human-environment relationships which stressed the sustainable use of renewable natural resources over long periods of time:

Vuli: If I start with the simplest example of a tree. So what do we get from a tree? We get wood, so what if we cut all these trees down? We get the
excess of wood, money. So what would happen at the end of the day? This long term view is how I would introduce it, with these simple examples, like grass and grazing. (DS#1, Vuli, 2)

Associated with an acknowledgment of resource extraction is the requirement that use of the non-human world must be justifiable in terms of human needs, and organised with a view to long-term sustainable use. Concerning the former:

Sibu: Well, I think it would all depend on the question why he is wanting to cut the tree down. If I see people cutting down the trees, and maybe cutting them in order to make the papers, I wouldn't feel bad. Just cutting trees, for no reason? But cutting trees to build yourself a shelter: Well, I don't mind. (DS#2, Sibu, IV, 32; emphasis in original)

In order to make the second point, that resource extraction which is not organised (and restrained) can lead to environmental degradation, Sibu referred to his knowledge of the deforestation of a previously-wooded area near his home:

Sibu: But I think that, if one is actually aware of all this, we can have a way of doing it. I'm not saying that we should not go to the forest and get some wood, but there should be a way of doing it: you cannot just go into the forest and start cutting wood, so to speak. For instance, I'm from Ngwavuma. That place is actually a bushy area, so to speak, but now you can see that it is sort of a desert. Because people are just cutting the trees, for firewood, for shelters. The only places with wood are these places that are actually fenced. So you can see that this place was once very beautiful, but people have been negligent. Now, in the very near future, you won't have such a beautiful place like Ngwavuma. (DS#2, Sibu, II, 11)

Conceptualisation: Therapeutic value of nature

In his review of arguments for the preservation of nature, Fox (1990) describes a psychogenetic argument as a category within instrumental value theory. In terms of this psychogenetic argument we
... ought to preserve the nonhuman world because it provides us with a range of contexts and experiences that are essential to our healthy psychological survival and development. (p. 159)

Whereas most of the resource preservation arguments (e.g., the life support system) emphasise the importance of the natural world to humans for the development of healthy bodies, the psychogenetic argument emphasises the importance of the natural world to humans “for the development of healthy (sane) minds” (Fox, 1990, p. 160). Students’ responses which allude to these arguments have been organised within the label ‘therapeutic value of nature’, as this label captures various themes in their responses. The following themes are interwoven in the portrayal of this conceptualisation below: natural settings as reflective places, natural settings as places promoting freedom of thought, and natural settings as an escape from social settings.

Sibu valued his experiences in the natural settings at Hobitton for a variety of reasons. Concerning the two hours spent during the solitaire in the forest, for example, he appreciated the time to be alone, for the opportunity it provided him to think about his university experiences:

Sibu: Well, what I enjoyed there was just to be alone, and to reflect about things, to have time to think about my position. (DS#2, Sibu, II, 12)

In other words, he used his time in the forest to think about his life outside of the forest. One reason why the forest itself was conducive to such thoughts was that it reminded Sibu of his youth in rural Natal, a time of his life which seemed less demanding:

Sibu: Well, quite honestly, that experience actually took me back to the time when I was still a young boy. To the time when I used to fetch my father's cattle in the mountains. So it was something that was really enjoyable, because I had to go back and remember those old days, unlike today, when I am changed so much, you see? Sometimes you remember: ‘Ei’, it was better
during those old days, unlike today! Today's life is more demanding!  
(DS#2, Sibu, II, 12)

Gavin appreciated the forest in a similar fashion: the two hours he spent in it during the solitaire also provided him with the opportunity to think about aspects of his life away from the forest:

    Gavin: In the solitaire, it was nice looking at all those trees around me. Nothing to worry about. Just sitting quietly, thinking, mostly about the week-end, friends and family: stuff like that. The future. What I'm going to do.
    (DS#2, Gavin, II, 10)

Andrea described her interest in travelling to “quieter, more natural places”, such as the coast, and game farms in her first interview. Having been brought up in Johannesburg, she believed that it was important for her to “get away” from the city to these places, to be in greater contact with herself. She appreciated these natural settings for the opportunity they provided her to reflect on herself and events in her life:

    Andrea: It's nice for me to get away, and to actually get in contact. Being in more natural surroundings, I find that I'm in contact with myself more.
    (DS#2, Andrea, I, 7)

Andrea often expressed an interest in both social and bio-physical features of her surroundings. Visiting relatively natural settings afforded her the opportunity to reflect upon her activities in the urban setting: these reflective experiences provided her with a perspective on human society and her daily life. Clearly, there was something special about the natural settings which encouraged such reflections:

    Andrea: The most important thing for me is to be around people, but then, in a way, to meditate about what's going on. I think it's very good.
    Alistair: And you can't meditate by yourself like that at home?
    Andrea: No. There's something special about being out.
    Alistair: Ya? What do you think that specialness is?
Andrea: There's a peacefulness: it humbles you. You realise that the world would exist without mankind: we're not as wonderful as we think we are.

Alistair: And you only really think like that when you're away?

Andrea: Yes. When you're here you tend to go on your daily life, and your routine, and you don't actually consider these things. (DS#2, Andrea, I, 7)

Fox (1990) describes an aspect of the psychogenetic importance of unmanaged places as “a refuge from the heavily managed aspects of existence (. . . known colloquially as ‘getting away from it all’)” (p. 159). Andrea discussed this notion of ‘getting away from it all’ in terms of two different “realms” which she could move between. She distinguished natural (bio-physical) features, which she associated with a “spiritual realm”, from her life in the city, her “daily existence”. When asked to elaborate on these views, she discussed the value she experienced in being away, in terms of allowing her to think, and think through personal issues:

Andrea: I think that's because I always lived in towns. So for me, going away is associated with thinking, and time to myself.

Alistair: And you can't think like that in a town? Something's different?

Andrea: I can but, because you're taken out of your ordinary existence or life, just for that short while, I think you confront things more. You take more time out to think. I don't think that you can't do that at home. It's just that, being out in the open has always been, I suppose, just a special time for me because it's going away. (DS#2, Andrea, II, 13)

Consistent with these views, Andrea experienced the solitaire during the Hobitton excursion as an opportunity to reflect upon her relationships with other people:

Andrea: I enjoyed it. I went there feeling quite sort of selfish: “I can do whatever I like now, and think whatever I want”, you know? I didn't have to think about anyone else.

Alistair: And, what sort of things did you think about?

Andrea: I just thought about ways in which I'm relating to people, and what's happening. About myself, and things that I wanted to do this year. (DS#2, Andrea, II, 14)
Jennifer similarly appreciated time spent in natural settings for the opportunity to escape from her social world. During the fourth interview in the Botanical Gardens, I asked her to discuss her feelings in relation to the surrounding setting. She was quite clear on how she often used such opportunities to ponder her social situation, rather than focus on bio-physical features about her:

Jennifer: Well, it's difficult here, because, I mean, there's this highway .. but at home, like, walking to the beach, it's very unspoilt and very quiet. In that way, I always just see it as an escape. When I need time to be quiet, like, you know, to go for a quiet walk. Then, I'll sit there, I'll sit amongst it. I don't really think about it as much as I think about my life. It's sort of an escape for me. (DS#2, Jennifer, IV, 31; emphasis added)

In previous discussions on her experiences as a school pupil, Jennifer had commented forcefully on her dislike of being “imposed upon”, both by teachers and authoritarian values. In the final interview she also commented, while discussing the notion of rights, that her “strongest right . . . is not to be imposed on, by something, or someone else”. This view was apparent in her appreciation of time spent in natural settings. Natural settings are especially conducive to promoting freedom of thought because she does not perceive any sense of being imposed upon in such settings, given the absence of human artefacts associated with daily chores and activities. Continuing with the preceding excerpt:

Alistair: Why is it more of an escape, than if you sat in a room somewhere, undisturbed?

Jennifer: I hate sitting inside! When I sit inside, I have to be doing something specific. That's why in Grahamstown I get so frustrated living in a flat. To be inside, you've got to be doing something: you've got to be working, or watching TV, or doing something.

Alistair: Whereas, when you are in a place like this?

Jennifer: You could be just thinking, or reading. There are no concrete walls. It's not painted a specific colour, with pictures on the walls. It's open air, and I feel more like I'm me, when I'm somewhere like that, than when I'm in a room. You are not being imposed on by what is in the room, and what you
usually do in the room. I just think, when I am in a room, that I should be

doing something.

Alistair: I'm wondering what it is about sitting in a setting like this that is conducive
to thinking about things?

Jennifer: I find it relaxing. The open air most of all. No one to disturb you. You
don't hear cars, you don't hear the dogs barking. You are not being
imposed on by anything or anyone. I think your mind is just more open.
There is nothing to disturb you. Like, when I sit in a room, I look for
something. And here, you are not looking for anything, you are just being
yourself, you are thinking your own thoughts. It's more personal.
(DS#2, Jennifer, IV, 33; emphasis added)

Natural settings can be considered to represent the antithesis of “heavily managed
and especially totalitarian contexts” (Fox, 1990, p. 159), and this seems to capture much
of the sense in which Jennifer appreciates time spent in such settings. In the excerpt above,
she values time spent in unmanaged places because she feels that those settings allow her a
freedom of thought which she does not experience in towns. Like Andrea, she found that
time spent in quiet natural settings encouraged her to reconnect with her inner self and her
personal thoughts—to follow her own agenda, as it were. She described these different
settings (social and natural) in terms of two different “worlds” which she moved between:

Jennifer: Yes, very definitely. And, when I need a break, I like to be separate in that
world. I mean, there are days in your life that you actually forget you are
separate, because you are so busy. You are so busy doing things you have
to do, and then, you get stressed and you realise you need to be by
yourself. And, that's when you go into your ‘escape-type’ world, and you
feel like you are you: yourself. (DS#2, Jennifer, IV, 33)

**Summary and discussion of data analysis for research question 2**

Thirteen conceptualisations were presented to describe qualitatively different ways
in which students conceptualised human-nature relationships. The presentation began with
a conceptualisation of humans as sharing common processes of origin with the natural
world. The remaining twelve conceptualisations were organised within four categories. One category described students' understandings of separateness and connectedness with respect to the natural world, and three categories were based upon the value of the natural (non-human) world. Together, these conceptualisations constitute the study's outcomes with respect to the second research question.

My goal in the interviews was to encourage students to articulate their beliefs in relation to issues concerning human-nature relationships. This often necessitated posing successive 'Why' questions (which, as Sibu commented, were questions which some students were not used to facing). Naess contends that asking strings of 'Why?' and/or 'How?' questions eventually takes one beyond the realm of the everyday, the technical, and the scientific, and into the realm of the philosophical (Fox, 1990, p. 92). In this sense, the outcomes portray elements of students' philosophical knowledge on human-nature relationships; that is, elements of their eco-philosophies.

Presentation of students' eco-philosophical perspectives began with a 'shared processes of origin' conceptualisation, as it portrays students' accounts of how different forms of life came to exist. Without exception, students accounted for the existence of diverse forms of life, including humans, in terms of having come to exist as a result of the same processes. These processes included evolutionary (scientific) and religious interpretations and were organised within the same conceptualisation because the research focus was to explore how students thought of themselves in relation to the natural world. The following question influenced analysis of the data with respect to the development of this conceptualisation: did students think of humans as being fundamentally different from other forms of life? This conceptualisation conveys a way of thinking about humans and non-humans in terms of common-ness, as sharing features and/or processes, hence being related to each other. Humans, in other words, were not fundamentally different to the (rest of) the natural world in this regard.
With the exception of the category which portrays an inherent value conceptualisation, the remaining four categories consist of sets of conceptualisations. The category 'conceptualisations of human-nature connections' portrays students' perspectives of themselves (and/or humans in general) as connected to, and separate from, the natural world. As with the 'shared origin' conceptualisation, this category portrays conceptualisations of human-nature relationships in fairly broad terms. The purpose of developing students' perspectives in this category derived from comments and conjectures made by noted scholars in environmental thought. Remember, for instance, Evernden's (1985) contention that "the sense of separation which Descartes bequeathed to us may well be the most potent adversary of environmental thought" (p. 54). One of the conceptualisations presented within this category portrays a way of thinking of humans as separate from the natural world. Another conceptualisation portrayed how humans were becoming alienated from nature.

It would be possible to arrange conceptualisations within the remaining categories under an 'ethics' label, because views presented within these categories address ethical responsibilities of humans in relation to the natural world. Underlying ways of thinking how one should act in relation to nature are diverse beliefs in the value of nature. As discussed in Chapter 2, a central concern of environmental ethics is the development of a theory of value in regard to the natural world. This concept of value was used to organise students' conceptualisations because students based their discussions, at times implicitly and often explicitly, on a particular way of attributing value to the natural world. The different senses of value which were evident in their responses included elements of intrinsic, inherent, and instrumental value approaches.

First, four qualitatively different approaches to thinking about the intrinsic value of non-human organisms and entities were evident in the students' responses. These were labelled according to the criteria which students espoused as providing the basis for the intrinsic value: awareness-based, life-based, ecosystem-based, and expressive of God's
purpose. Then, a conceptualisation which implied an inherent value of natural settings was portrayed. Finally, three conceptualisations which were based upon instrumental valuations of the natural world were presented: custodian/preservationist, wise-use of nature, and therapeutic value.

The similarities between the conceptualisations presented above and Fox's (1990) classes of value theory is discussed more fully in the final chapter. As a purpose of this overview is to review and establish the outcomes for discussion in the final chapter, two matters relating to this outcome of similarity are revisited here. They concern the validity of the study, especially the analytical process by which I account for the origin and development of these categories.

The intention was to portray students' conceptualisations and this intention permeated the conduct of the study. These procedural issues were discussed in relation to two phases of the study, namely the data collection phase (the interviews), and the analysis of the interview data. Concerning the former, evidence from the meta-interviews supported the claim that the research process enabled students' to espouse their beliefs openly and honestly. A discussion on the second aspect, namely a tension in the extent to which research outcomes are both preconceived by the researcher and emergent within the data, was also presented in Chapter 3. Finally, to support the claim that the conceptualisations derive mainly from the students, the presentation comprised many excerpts to illustrate the students' viewpoints.

In sum, the outcome space with respect to the second research question consists of thirteen conceptualisations of human-nature relationships. There are similarities between the content of these conceptualisations and perspectives in the eco-philosophical literature.
CHAPTER 6
Students' experiences of the environmental education sessions

Introduction

The third research question was presented in Chapter 1 as:

What are some different senses which students make of their environmental education experiences in the teacher education program?

With its mandatory environmental education sessions, the Rhodes University teacher education program provided an appropriate context in which to interview students in relation to the first two research questions. By questioning students on their experiences of natural settings during the teacher education program, I was able to use their responses to frame the descriptive categories presented in Chapters 4 and 5. In this Chapter, students responses are used to develop an account of their experiences of the environmental education sessions (hereafter referred to as sessions) The expectation here is that an understanding of how students experienced these sessions may provide additional insights to inform the practice of incorporating elements of an environmental curriculum in teacher education. After all, it is the individual's interpretation of his or her experiences that is so important in developing an understanding of the world through another's eyes—in determining how someone has understood what they have experienced (MacKinnon, 1989b). This chapter describes how students experienced these sessions, drawing on the second data set alone (the interviews conducted in 1993, by myself).

There is some overlap between the data used to develop the categories presented below and the data which is portrayed in Chapters 4 and 5, for although the research questions have been treated as distinct for analytical purposes, they are clearly related. The reader will find, for example, that some excerpts presented in the previous sections are revisited in this section to convey the students' interpretations of particular sessions.
Students' responses are presented within a framework of the program's structure, namely, the outdoor experiential session (the Outward Bound excursion), and the university-based class sessions (e.g., course lectures, and the environmentalism presentation).

**The Outward Bound (Hobitton) excursion**

As described in a mission statement, presented more fully in Chapter I, the purpose of Outward Bound's educational activities is “to develop respect for self, care for others, responsibility to the community, and sensitivity to the environment” (Miner & Boldt, 1981, p. 348). From the perspective of the Rhodes University Department of Education, one aim of including the Hobitton excursion in the second week of the teacher education program was “for students and staff.. to get to know each other” (Euvrard & van der Mescht, 1993, p. 17). This was how this excursion was introduced to the students by Mr. George Euvrard, lecturer for the Educational Studies course.

During the Hobitton excursion there was little organised discussion on the various activities by either students or instructors. Consistent with an emphasis on the experiential approach, the instructors encouraged students to engage in the activities with minimal suggestions and comments from themselves. Hence, how the students made sense of these experiences was more likely to result from their own interpretations, and less likely to be derived from what instructors may have said.

Participants in this study were from diverse cultures and schooling systems; for some, environmental education was a new concept. Indeed, some students had no prior experience of “education in the environment” activities such as those which occurred during the excursion. Sandile indicated, for example, a lack of familiarity with experiential and participatory approaches to education, and a receptiveness to such learning experiences:

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4 Details of the various activities which students experienced during the four day excursion are provided in Chapter 3, Section III.
Sandile: You see, what happened for me, when I went out there, I said to myself: I'll open myself up, to whatever we will experience when we were going to Hobitton. I'll open myself up, and I'll try. I said even to my other people, that “We have to make the most out of this. We have to enjoy ourselves, in order that this trip is OK for us, all of us. This may not be what we are used to, but let us open ourselves, so that we can get what we are supposed to get out of this. Maybe we are closing ourselves”. That's what I said. (DS#2, Sandile, I, 5)

Students' responses to the Hobitton excursion are organised in two categories: ‘The opportunity to experience nature directly, and to appreciate it’, and ‘The value of co-operative group-work in overcoming difficulties’ (such as the challenges presented in the various obstacles the students faced).

The opportunity to experience nature directly, and to appreciate it

During interviews with particular students, it became apparent that their knowledge of the natural world was derived to a very large extent from indirect experiences, such as reading books or watching television programs. That much of one's knowledge is derived indirectly from such sources is true for all of us. However, the excursion to Hobitton provided some students with their first direct experience of a natural setting relatively undisturbed by humans. For example, Sandile's experience of hiking through the forest to the escarpment was particularly memorable for the opportunity it provided for him to be in the sort of setting that he had previously experienced only vicariously through pictures:

Sandile: When we were up there [above the forest], you see beautiful sights. Right? As you usually see in the postcards. So when we were up there, we actually could see the views that capture the photographers to take those pictures for the postcards. (DS#2, Sandile, I, 3)

Sandile confirmed that his visit to the ‘Madonna and Child’ waterfall was the first time that he had ever seen a waterfall in such pristine condition. It was especially interesting to him
to experience in person these natural phenomena as he could relate these experiences to knowledge derived from academic studies:

Sandile: We sort of theorise about these things, every time at school, at our places. When I was studying geography, we learned about these things. Now, seeing those things for the first time, you kind of get a kick from what you were told. (DS#2, Sandile, I, 3-4)

There were different ways in which students experienced these natural settings within this broad frame of ‘an opportunity for direct experience’. These include different forms of appreciation, such as use-based and aesthetic appreciation; as well as an opportunity to ‘get to know’, and to ‘explore intricate detail’ of living things. One may think of these different appreciations in terms of different foci of interest which were evident in the students’ responses. These different foci are embedded within the following discussion of the senses students made of activities which occurred in natural settings during the Hobitton excursion.

As with Sandile, Sibu also found the activities in the forest and visit to the waterfall memorable as an opportunity to directly experience natural settings. Not only was this a personal accomplishment for him, but his experiences also prompted an aesthetic response:

Sibu: My reaction was just to appreciate the beauty that I was seeing. And to me, it was sort of an accomplishment, because I was seeing the thing for the first time. I actually knew that there are things like that, you see? But, it was my first experience to see a waterfall. Not to see it on a paper, photo, or as a picture, but, just to see it, in reality. (DS#2, Sibu, II, 17)

A number of students described their experiences of these natural features in terms of appreciation. There are different ways in which one might appreciate some thing or process: a use-based appreciation may be distinguished from an aesthetic appreciation, for instance. An aesthetic experience requires an attitude of disinterest (that is, non-practical), where the object is valued for its own sake, rather than for its potential use (Armstrong &
Botzler, 1993; Chapter 5). During the visit to the waterfall, for example, Mike discussed how he appreciated water. Some of his appreciation was directly related to the use of water for farming purposes, and the strength of this appreciation was probably heightened by a severe drought that was occurring throughout most of southern Africa. In addition to articulating a use-based appreciation, he also alluded to an aesthetic appreciation of water:

Alistair: What was “nice” to you, about [the waterfall]?
Mike: Water! When it rains, the first thing I do is just stand at the window, and watch it for hours. It's just all the water and, you can just drink it, and it tastes nice, and looks beautiful.
Alistair: So water means something special?
Mike: Ya, water does, definitely. When it rains, I get captivated, and just sit and watch it. It's funny: at the school, when it rains really hard, you'll see all of us sitting at the window. We all sit in a row, elbows on the window-sill and just look out at the rain. (DS#2, Mike, II, 14)

Siyanda's experience of the waterfall was aesthetic and was enhanced by the fact that she had not seen such places before and because she thought it unlikely that she would have the opportunity to do so in the future. The value she placed on the excursion to the waterfall was framed in terms of beauty and enjoyment:

Siyanda: I wasn't thinking much. I was just thinking of the waterfall. Just appreciating the waterfall. It was quite beautiful.
Alistair: It is difficult to speak to, but what's .. ?
Siyanda: It was just a beautiful scene. A beautiful view, so I was enjoying looking at the waterfall, because, in my life, I am not able to go to the waterfalls. So, I was just enjoying looking at it. (DS#2, Siyanda, II, 28)

Turning now to the two hours spent in the forest during the solitaire, Gavin describes how he took the opportunity to examine details of some of the living things around him. He experienced the solitaire's two hours with an increased awareness of the natural world. Gavin appreciated this opportunity to “really look” and “see how much I could see”:
Because most of the time, you see without looking. So, I was first looking at the trees, because, most of the time, you just see trees. Then, the finer details, the branches, the leaves, just getting to know the surroundings.

Why do you think you were interested in the detail?

Just curious, I think. To see how much you can actually see, when you really, really want to look at things. (DS#2, Gavin, II, 10)

Similarly, Jennifer's thoughts during the solitaire focused on natural phenomena, and she enjoyed her increased awareness of different living things. The two hours spent alone in the forest provided her with the opportunity to consider the "small details" of living things about her:

They were small thoughts, like the sounds: the sounds were so clear. All the perceptions, the sounds, the smells, there was a mushroom at my feet, and you don't have time, to ever .. I mean, you do have time, if you're interested in that, but, a person like me, I would never have time here, to stop and really look at a mushroom. So I really enjoyed that. Small details suddenly become more important. I didn't think about things like family at all. (DS#2, Jennifer, II, 16)

Within this 'mental mindset' of increased awareness, Jennifer was prompted to reflect on the enduring quality of the natural world. Continuing from above:

And, what were you thinking about?

Well, I looked at its structure: what it looks like, you know? The tiniest little folds, and the way it just sort of stood out in the path. Like an exclamation mark! I'd look at everything. Like the tree stump: I was sitting next to a huge tree stump, and it was funny to think that it's still there, and it will be for a long time. (DS#2, Jennifer, II, 16)

Many students used their time in the natural setting to reflect upon their lives and activities: this experience of nature is elaborated in the conceptualisation 'therapeutic value of nature' (Chapter 5). In her interview, Gail brought up the solitaire for discussion as one
of the highlights of the excursion, it being a “therapeutic” experience for her. The opportunity to spend undisturbed time “alone in nature” encouraged her to gain a perspective on her personal problems, through thinking about herself in relation to nature:

Gail: I find it very therapeutic. Just to be quiet, and alone in nature. That Solitaire we did: I thought that was great!

Alistair: Had you done something like that before?

Gail: No. But it didn’t phase me! At first, when it started getting dark, at dusk, that transition period, I hoped there weren’t too many bugs. But other than bugs, nothing actually bothered me. I loved it! I actually lay back, and watched the stars, and let my mind go on a trip.

Alistair: What sort of things were you thinking about?

Gail: Self-reflection, a lot of it. Yes. Maybe I use the natural environment to put myself back in perspective. Often your own personal problems become so huge in your own mind, and you get out and you just think, “I’m just a little part of this”. You know? “What does it actually matter?”! (DS#2, Gail, 6)

These foci of interest portray students’ different experiences of the natural settings where they spent time during the Hobitton excursion—particularly the forest, and the waterfall. One of the main activities of the excursion was for students to participate as groups in negotiating obstacles, such as a rope and wood obstacle course and other problem-solving activities which necessitated co-operation among members of the group. All of the interviewees completed these activities. The following category, ‘the value of co-operative groupwork in overcoming difficulties’, portrays students’ experiences of these aspects of the excursion.

The value of co-operative groupwork in overcoming difficulties

The Hobitton excursion was presented to the students primarily as an opportunity to ‘get to know each other’, and most of the problem-solving activities were designed to foster an appreciation of the value of working together in groups. For example, to successfully ascend ‘Jacob's Ladder’, a series of horizontal poles more than a metre apart
and up to 18m high, groups of three students had to assist one another throughout the exercise. These messages, implicit in activities such as ‘Jacob's Ladder’ and explicit in the instructors' exhortations, were received loudly and clearly.

The obstacle exercises confirmed Sandile's appreciation of the value of collaborative efforts, not only as a means to solving problems but in the more profound sense of a fundamental African concept, *ubuntu*. This concept may be translated as “a person is a person by means of other people” (Wilson & Ramphele, 1989, p. 269). As Wilson and Ramphele describe, this proverb suggests that one's own humanness depends upon recognising and respecting the humanity of others. With obvious conviction, Sandile described his belief that a normal and healthy life is contingent upon constant and respectful interactions with other people such as one's neighbours and friends. A particularly important aspect of the Hobitton excursion for him was the way in which the different activities stressed the necessity for, and the value of, social interaction:

Sandile: [The Hobitton excursion] stressed what I always believed: that you cannot do things alone. You may be expert in a certain thing, but definitely, you do need other people in other fields. You need other people for your life to be normal, right? So, it cannot be that, maybe, “I'm a doctor”, or something, and then you think that because you've got a lot of money, you can live alone. You cannot. (DS#2, Sandile, 10; emphasis in original)

A highpoint of Mike's week-end was seeing the benefits of collaborative effort epitomised in the struggles of three of his classmates to surmount the ‘Jacob's Ladder’:

Mike: Seeing these two girls get up Jacob's Ladder, with Pete taking them up. That was what I'd remember for a long time. It was just also our teamwork. Everyone down at the bottom was shouting, encouraging. A very good vibe. I think we were even more excited than them, getting to the top! (DS#2, Mike, II, 13)

In his final interview, Mike reiterated this belief in the value of working together, especially with “other types” of people with whom he normally would not associate. This included
'black' classmates, as well as those less physically competent than himself. Being an avid sports enthusiast, he found the various activities encouraged him to recognise that physical competence was but one means of measuring other people:

Mike: What I gained? Just mixing with people that I don't know, that I wouldn't normally mix with. Non-outdoor types with outdoor types, and different racial groups, different language groups. It's helped me to get along with people who I don't normally get along with. I saw some of these people's strengths, not just their weaknesses. (DS#2, Mike, V, 35)

Gavin found the experiences to be valuable for the way in which they increased his confidence in being able to overcome seemingly impossible challenges, all the more so because he believed that he would transfer this confidence to different contexts. Having successfully negotiated the challenges of the various obstacles, which at first appeared impossible, he felt more willing to face up to seemingly impossible challenges in the future:

Gavin: What I remember most about Hobbiton, is doing the difficult stuff. Things that you don't think you'll be able to do, and then you do it and get it right. That will stay with me. If it looks hard, don't think it's going to be impossible. That's what I think was the most valuable lesson that I got from Hobitton. (DS#2, Gavin, V, 31)

Sibu, too, valued the message he gained from these activities that "if one is determined, one will always make it":

Sibu: Because, sometimes, we were asked to do things that I really thought were difficult: for instance, climbing, and all those things. And, you just could not refuse: you had to attend. And then you attend, and you find that you succeed! (DS#2, Sibu, V, 36)

Andrea saw a metaphor in the excursion's emphasis on the importance on working together. Just as she depended on her classmates in order to meet the challenges, so she depended on the natural world for her needs:
Andrea: Like at Hobitton, how we had to learn how we had to depend on each other, so we have to depend on the environment. (DS#2, Andrea, II, 15)

Andrea similarly described how these experiences had both confirmed and deepened her understanding of the concept of interdependence. When asked in the second interview for “something significant which she thought she gained from the excursion”, she drew attention to the importance of this concept in terms of social interactions:

Andrea: I think .. really that interdependence. Which I knew. I knew we had to rely on other people, and work together, but, it was the willingness with which people did that. It was really nice to see people admitting their weaknesses unashamedly, and then other people wanting to help so much, and encourage: that was nice. Thinking about it in terms of education, I realise what a good teaching method it was.

Alistair: To present people with challenges?

Andrea: Yes, and getting them to do it. It made me realise how effective it was. You kind of think of it, and think “Ya, it works”, but, it really did work! And, Ya, it showed me that I need to depend on people as well: I like to think of myself as fairly independent, but I really did need to rely on people. (DS#2, Andrea, II, 15-16)

Andrea repeated these views in the final interview, drawing associations between the group-based activities and environmentally-responsible actions. Her experience of the overnight expedition and of an orienteering exercise—where students were required to make do with little equipment—prompted her to think of using resources efficiently:

Andrea: It developed such a feeling of spirit, as opposed to just being individuals in the class. And, of course, it brings out a lot of other things, like the environmental issues. It's underlying everything there, at Hobitton.

Alistair: How did it bring them out?

Alistair: Just having to be aware of trying to not have too much impact on the environment. And the whole thing of using minimal resources. You know, when we were doing orienteering and you've got minimal resources, you have to make them work. And, that's together with your people, so you are using your resources to the best of your ability. (DS#2, Andrea, V, 32)
While Sibu thoroughly enjoyed and appreciated the various experiences of the Hobitton excursion, he did not see how they could be meaningfully translated to teaching settings, especially those in which he expected to find himself. The Hobitton experience was far removed from the realities of the crisis in ‘black’ education and his teaching prospects in economically-impoverished communities:

Sibu: Well I don't think it was of much value, because I went there, you see, and I'm alone. I'm from Natal. And when I finish this, I'll have to go to teach in Natal. So, when I get to my place, no one among those peoples I'll be teaching has gone to such places like Hobbiton. It will be just telling them a fairy tale: that I was once to a place like Hobbiton, and this is what I experienced. (DS#2, Sibu, II, 16)

Sibu's comments highlight the markedly different contexts in which students may begin their professional career, especially teaching situations which bear little resemblance to those experienced in their teacher education.

These descriptions portray how students experienced the experiential ‘education in the environment’ activities of the Hobitton excursion. This excursion occurred over the second week-end of the HDE program and the other environmental education-related sessions took place after this excursion, mostly on the university campus.

The **university-based sessions**

The environmental education sessions which students attended as components of the Educational Studies course were held in the main lecture theatre during the first term of the 1993 HDE program and are described in some detail in Chapter 3. They included: an introductory lecture on the historical development of environmental education, a lecture on Orr's (1992) chapters “What is education for?” and “Place and pedagogy”, a presentation by a group of students on environmentalism as an approach to teaching and learning, and a workshop on incorporating environmental perspectives in teaching subjects (held at the
Thomas Baines Nature Reserve). As the excursion to the Thomas Baines Nature Reserve occurred immediately before the start of a vacation, some students absented themselves. Also, as the final interview occurred after it, students' experiences of this excursion were not explored in sufficient detail to enable a proper account here.

Students' experiences of the class-based sessions are again presented in a discursive style, drawing attention to their foci of interest. This begins with a description of how some students had never heard of environmental education before they entered the program and continues with a portrayal of some different themes portraying how they experienced the sessions.

On being exposed to environmental education

Environmental education was a new term for some students, one they had not heard of before. Consequently, some believed they had experienced little, if any, 'environmental' education in their school or university curricula:

Gavin: I haven't come across it this way as in the class: environmental education. Most of the time, it was separate: environment, education. We weren't taught that much about the environment in education. I think the only subject we did it in, was Biology. And that's it. (DS#2, Gavin, III, 18)

Sibu, too, described how the Department's interest in environmental education was a "new experience" for him. His view was that, because he had no prior experience of this 'thing', he was keen to learn what 'it' was all about, "what is actually happening in environmental education" (DS#2, Sibu, III, 24).

During the second interview, Sibu discussed his involvement in the sessions. In the previous week, he had submitted a short assignment on 'The Hobitton excursion as environmental education', and I asked him how he had found the assignment. His response indicated a difficulty he had with the association between environmental education and social change. If the purpose of incorporating environmental education within teacher
education was to educate student teachers, he could accept this. However, if the purpose was to bring about change in schools, he did not see how this could be achieved. Given this unrealistic goal, he placed little value in the sessions for his own interests:

Sibu: Well, I think it was useful for the Department.
Alistair: And, for you?
Sibu: Ah, not for me. No, it was not useful. It was just another assignment, but anyway, I had to write it, because it was important for the Department.
Alistair: What was the problem with it?
Sibu: Well, I went there. I saw everything that was happening there. So, what next? What should I do about it? And I doubt that little knowledge that I actually acquired can actually make other people change. For instance, I cannot just go to a meeting there, and start teaching this whole community of Grahamstown not to litter the area, and to take care of the environment. I think it was just a small thing, it wouldn't have a large effect, of which I'm doubting the success of it. (DS#2, Sibu, II, 15; emphasis in original)

These views persisted through the duration of the interviews. Sibu understood the interest in environmental education to be a unique focus of the Rhodes teacher education program. While he expected his experiences of these sessions to contribute to his personal growth, he felt that one institution could not possibly produce enough advocates to bring about the widespread changes which he believed environmental education called for:

Sibu: So, I think we won't make much effect when we go out to teach about environmental education, because we are actually a very small number of students. So, even if we are taught about environmental education, I think that will be just our personal growth anyway. It won't help another person who has never come to Rhodes. Maybe, say, you are at (the University of) Fort Hare, and in their HDE they do not have this, so, the effect of it will be very minimal. Because, honestly, I think if everyone could be involved in it, there could be change. But as long as there are few people who are aware of it, there will not be much change. (DS#2, Sibu, V, 37)
Underlying this difficulty in ‘spreading the message’ was Sibu’s understanding that there was little connection between these learning experiences and his home situation. He likened the sessions to his experience of the Hobitton excursion. While they contributed to his own personal development, when he considered them in the context of his home in rural Natal, he saw them as “fairy tales”. The prospect of promoting environmental education in that setting by himself was simply unrealistic.

Thinking back over her first term in the program, Andrea considered that even mere mention of the concepts ‘environment’ and ‘environmental education’ throughout that term, and the inclusion of the various sessions in the structure of the program, were beneficial as they raised her awareness of environmental issues:

Andrea: I think the fact that it has been introduced is really good. You know, I was speaking to friends of mine who are doing HDEs in other parts of the country, and they haven't been exposed to environmental education at all. Whereas, I would say, that each of us at least are fairly aware. Each one of us in the class, at least, know what it is, or something that's going on. So, I think that's good.

Alistair: What sort of things have you been made aware of? That are important to you?

Andrea: I think, I've been made more aware of how important it is, to include it in our education system. And, for each person to become more aware. I think that's what I've learned. (DS#2, Andrea, V, 35)

Once incorporated into the structure of the program, concepts and perspectives associated with environmental education invariably filtered into discussions, within and outside of classtime. Andrea considered that the inclusion of environmentally-oriented discussions throughout the program, such as those which occurred in her ‘Methods’ classes, were at least as informative as the formal environmental education sessions. Moreover, she thought these integrated sessions were valuable not for the introduction of new content, but for the manner in which they increased students' awareness of environmental perspectives:
Andrea: I don't think that I've learned anything new in terms of facts, content. And, although we've only had a few lectures, it's creeped in to other discussions along the way. And I think, that's probably had more impact than the specific lectures: it's sort of seeped in, in a lot of ways... It makes people more conscious, and they internalise it more, I think. If you repeatedly are exposed to something, but it's not forced on you, I think that can have greater effect. (DS#2, Andrea, V, 40; emphasis in original)

Themes of experience of the sessions

Andrea's description above paints a broad picture of what I contend was a widespread outcome of the environmental education sessions as a whole. Within this broad frame of increased awareness, students responded differently to the sessions. Four themes are interwoven in the following sub-section, in this order:

• re-thinking environmentalism and environmental education in terms of interconnectedness;
• rejecting externally imposed views;
• interpreting interconnectedness as interdisciplinary connections; and
• environmental education as relevant education.

As described in Chapter 4, some students conceptualised environmental education in a manner that equated it with scientific knowledge of 'green issues' (such as deforestation and endangered species). The following account draws on the responses of two students in particular—Kim and Gail—who were members of the group which presented the 'environmentalism' session to the rest of the class. Kim and Gail were requested to be interviewed soon after that event, because their discussions in the presentation, particularly in the question and answer period, illustrated a number of perspectives which directly concerned how students thought about environmental education, and how they responded to the sessions. In hindsight, this group's interpretation of environmentalism had considerable influence on the interviewees.
Gail was initially not at all enthused with the prospect of speaking to the class on ‘environmentalism as an approach to teaching and learning’, largely because she associated environmentalism with green issues and with a fanaticism which she resented. It was not the values which she disagreed so strongly with, but rather the manner in which environmentalists forced these upon people. Gail had resented this approach since her schooldays:

Gail: We had a lot of it pushed at school, especially things like soil conservation, that kind of thing. And green issues. Well, environmentalism has been a catch word, especially in the 1980s, so that when I was in High School they were just getting onto this number. There were lots of people who were on this fanatical roll on health and the environment. Things like: “Right, it's break time, kids, let's go and pick up papers”. And I just thought: “Aw hell”!

Alistair: Don't you agree with having to picking up papers?
Gail: Yes, I do, but it's the attitude with which it was brought across. I've come into contact with a lot of the same kind of attitude: narrow-minded, fanatical, and petty. I saw environmentalism as a very shallow thing.

(DS#2, Gail, 5)

A turning point for Gail was a presentation by one of the staff members to the group preparing the presentation on environmentalism, in which the staff member “downplayed the green issues .. and gave a handout which spoke about values” (DS#2, Gail, 2). This was significant because it encouraged Gail to make up her own mind with respect to the issue, rather than having a particular value imposed upon her. This made the issue more personally meaningful to her. Importantly, it was a process she could actively engage in:

Gail: I think, seeing that there is a deeper side to it, a more personal side, something that I can do: maybe that's what it is. Maybe it's just, as far as the values, and that side of it goes, that is something that I can do. I can't go out and save the whales. So, that's maybe why I respond more to that.

(DS#2, Gail, 2; emphasis in original)
While Gail could accept why people became involved in environmental issues, such as the commercial exploitation of whales, she resented having these issues imposed upon her by environmentalists with personal and professional interests which she did not necessarily understand or share. After all, issues which she considered to be important, and which related to her personal and professional interests, were not necessarily shared by others:

Gail: They've obviously followed that train of study, and they've got to the stage where they feel these things are accessible to them. The fact that whales are being killed: 'this kind of whale, and it's affecting the ecology in this kind of way, these are the ways that we can stop it, and we need to go about it'. So, they are now on a big world-saving number for the whales, right? That is accessible to them, because that is their field. For me, if somebody came to me with an existential crisis, that is my field, and for somebody coming in who doesn't know what an existential crisis is, or why it matters, it's inaccessible, and it's probably not interesting, because they are not coming from where I am coming from. (DS#2, Gail, 9; emphases in original)

Gail sensed that her views on environmental education had changed as a result of becoming more aware of the differing value positions which were embedded within environmental issues. Further, she expressed the importance of personal relevance for meaningful engagement in issues:

Alistair: And your views of environmental education: have they changed during this course?

Gail: Definitely. I feel it's accessible. It's just a lot more accessible. I don't like extremes. I like passion about things, but I don't like extreme views: politically, you know, left and right, that kind of thing. I feel when you get too emotionally caught up in something, you actually go overboard, and you lose sight. You become so subjective that you're not really of as much good as you could be, if you keep your perspective. And, I think the view that I had about environmentalism, was that it was a very fanatical thing. And, that is not accessible to me, because I'm not an expert in that area, and I don't have that fanatic response to those issues. But, what I find of
personal value, are things like values. I mean, like Psychology is my whole vibe, and that's where I access the world, from that perspective. So when you bring that in, and you make it relevant to that, I can relate.
(DS#2, Gail, 4)

Kim's response was similar to Gail's: it came as a revelation to her that there was a broad range of perspectives embedded in the environmental movement, beyond the details of any one "green issue":

Kim: Well, I really thought environmentalism was only about 'green issues'... I had never seen the other side of it, and I was actually very impressed. Wow: it actually deals with life! It's not just saving the whales, it's a whole theory on life. I mean, some of the things we went through, they brought in religions, like Zen Buddhism: it goes quite deep into everything. I really had never realised that before. (DS#2, Kim, 6)

Kim's response brings to mind Livingston's vivid description of environmental issues as analogous to the tips of icebergs: they are the visible portion of a much larger entity, where the

... submerged mass constitutes the fundamental problem, that domain of unspoken assumptions which legitimates the behaviour which precipitates the state of affairs we designate as 'the environmental crisis'. (in Evernden, 1993a, p. xii)

Kim's and Gail's previous experiences of environmental education, both within and outside of classrooms, was confined to these "visible portions". In their experience, attention was always focussed on the specific details of environmental problems and they were admonished to behave in particular ways without exploring underlying conceptual perspectives, including their own, that accompanied the attendant value positions. Consequently, they found it both illuminating and personally relevant to be encouraged by a staff member to explore aspects of this 'submerged mass'.

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For Kim, insights into the underlying theoretical issues contributed to her sense of a "big picture" and enabled her to make sense of how various environmental issues were interconnected. While she had learned much detail during her university studies, she wanted to gain a perspective on this knowledge:

Kim: The main point is that you can't just look at something in isolation. You have to see the big picture. And, we never do that at varsity, we always have little things, little things, little things, and you plod through and you never actually see the big picture. You don't know "OK, where does this fit in?"... It's also a lot of just asking questions, asking questions, brainstorming. (DS#2, Kim, 2)

Their efforts during the research for the presentation resulted in them becoming more aware of the social complexity of environmental issues. Importantly, also, environmental issues became more "accessible" to them. Kim and Gail valued this approach very positively, as they felt it encouraged them to engage intellectually in the issues:

Gail: The whole thing of values, the whole thing of educating the educators to be more environmentally-aware, and the whole thing of inter-connectedness, that's something I can access. I can't access the ozone layer: I'm not a scientist, and there's nothing much I can do, except maybe try and not buy some aerosols. And even that: I don't really know what I'm buying, and what I'm not buying, you know? I haven't thought about it, but I think that could well be it. (DS#2, Gail, 2)

Another theme which was apparent in the students' responses to questions on the sessions involved equating the concept of interconnectedness, which Gail refers to above, with inter-disciplinary connections. This interpretation was made by the student members of the environmentalism presentation. For Kim, the interconnectedness of academic disciplines—the subjects one studied at school—was a core feature of environmental education (EE), one that distinguished it from 'normal' education:
Kim: When I was at school, if we were in an English classroom and we thought of something historical, it would be "Don't digress. We don't have enough time in the lesson, we must finish this. We can't talk about that now". But with environmental education, you can digress, and you can spend time doing that. Because if it's done in every subject, it's not like you are taking away from the English class, because the English might be done in the History class. So, it's letting them all be done together.

Alistair: So, that interdisciplinary aspect to you is environmental education?

Kim: Yes. In subjects.

Alistair: Whereas before, how would you have thought of it?

Kim: Well, before, I thought EE was taking the green issues and all that to the schools. But, it's not. Although, that is a part of it, I suppose.

(DS#2, Kim, 3)

In a discussion paper on incorporating these sessions in the 1993 teacher education program, Janse van Rensburg (1993), the staff member responsible for implementing the sessions, concluded that the presentation of environmentalism did not differ substantially from the one on humanism, except for an emphasis on the integration of subject matter to show inter-relationships among school subjects (art, mathematics, biology, geography, physical education, etc). Many students described how their perspectives on environmental education had changed as a result of views expressed in this presentation, and this emphasis on interdisciplinary connections was espoused by other class members. Mike, for example, considered that his views of environmental education had changed: from an initial focus on 'green issues' to a perspective on the interconnectedness of the different disciplines he had studied:

Mike: Everything interconnects, where you could teach Maths in a History lesson. Well, I think a lot of subjects do that anyway. It's just a lot more subtle: it's not hammered into the kids. When you are doing History, you are doing a time-line, so you are automatically doing a bit of Maths there. And Geography, you do a lot of Maths in Geography, and you do a lot of History in Geography. I think it's all there already, it's just a lot more
subtle. People don't realise it. But, it's good to get a view that everything does interconnect. (DS#2, Mike, IV, 33)

If one interprets the concept of interconnectedness in terms of interdisciplinary associations, as many of the students did, then it is reasonable to conclude that one is teaching ‘environmentally’ if one is making these associations explicit. For example, as Mike continues:

Mike: In fact, we are already doing a bit of environmentalism: that approach, the interconnectedness of all subjects. And I also believe that the subjects should work closer together, while still maintaining their identity. They should be able to work more coherently from each other, draw from each other. (DS#2, Mike, IV, 33)

Gavin, too, had come to appreciate the importance of the concept of interconnectedness as a result of the sessions. His interpretation of this concept was based on cause-effect relationships, and on interdisciplinary associations. When asked in the final interview to describe how he would like to influence his pupils, he discussed how he “would like to influence them environmentally”:

Gavin: Which is helping them look at the wholeness of things. Interconnectedness. Those are the two important aspects of environmental education, I think of. Yes, that I feel.

Alistair: By “interconnectedness”, what do you mean? Let's say ‘you are connected’?

Gavin: With everything, so that if you do one thing, it's going to influence something else. If the wind blows, the grass moves: force and reaction. Things are connected: if you walk over grass, it's going to bend. Connectedness: maths is not separate from accounting. It's a separate subject, but there are links. (DS#2, Gavin, V, 39)

Finally, a theme of environmental education as relevant education was apparent in Siyanda's responses. In her view, to incorporate an environmental perspective into one's teaching was to teach content that was relevant to the pupils' lives. In an interview soon
after the environmentalism presentation, she commented that she had enjoyed it mainly because she appreciated the efforts students had made to argue for the relevance of an interdisciplinary perspective. This perspective was valuable because it encouraged teachers to draw together aspects of curriculum, in order to make what they were teaching more relevant to the pupils' lives. This would help pupils accept that knowledge gained from school studies had relevance to their lives outside of the school setting:

Siyanda: I enjoyed the lesson that they gave. I mean, most people don't understand why certain subjects are important. So, I think environmentalism allows people to know the importance so that they, in future, will not neglect those subjects. (DS#2, Siyanda, IV, 21)

Siyanda repeated this view in the final interview, illustrating her point by drawing on instances from her own school and university experiences of having to learn detailed biological knowledge when she saw little or no relevance of that knowledge to her own situation. She contrasted this emphasis on irrelevant detail with an environmental perspective which would encourage pupils to draw connections between school curriculum and their activities beyond school. Siyanda strongly resented that she was forced to learn so much detailed information about organisms which was seemingly useless:

Siyanda: I think including environmentalism is an effective way to teach the kids. To know the impact of the subject they learn. Like I mentioned, I see things like learning the nutrition of invertebrates, especially marine invertebrates, as useless! I don't know how you see it, but I think it is useless! I mean, their locomotion, and all that. It is just learning detailed facts, and you don't know why. (DS#2, Siyanda, V, 26)
Summary and discussion of data analysis for research question 3

Students' experiences of the environmental education sessions in the 1993 teacher education program were presented within a framework of the outdoor experiential session (the Hobitton Outward Bound excursion), and the university-based class sessions.

The description of students' experiences of the Hobitton excursion were grouped within two broad categories, namely, 'the opportunity to experience nature directly, and to appreciate it', and 'the value of co-operative group-work in overcoming difficulties'. Within these categories, in turn, various foci of interest were described. Concerning students' thoughts on the university-based sessions, the following themes were interwoven in the description: perspectives on being exposed to environmental education broadly, re-thinking environmentalism and environmental education in terms of interconnectedness, interpreting interconnectedness as interdisciplinary connections, and thinking of environmental education as relevant education. In this discussion, attention focuses on the role and educational potential of the experiential session and on students' interpretations of interconnectedness.

The outcomes for the third research question are consistent with the constructivist perspective that students experienced the sessions with pre-existing cognitive commitments and made sense of their experiences in terms of those commitments. In terms of a constructivist theory on learning, prior experiences pre-figure the senses which students make of an educational intervention. While two students may share an experience, such as sitting quietly for two hours in a forest, they may make quite different senses of that 'shared' experience. In terms of personal meaning, one could say that they had different experiences. Some students used time available during the solitaire to explore the intricate detail of some living things about them, while others found the natural setting conducive to reflect upon their social activities.

Students also attributed senses of value to their experiences of these natural settings. Students' valuations of natural settings experienced during the Hobitton
excursion formed an important source of interview data for the second research question, and these responses were described in Chapter 5.

The excursion provided some students one of their few opportunities to spend time in a setting relatively undisturbed by human influence. This opportunity prompted them to think about ways in which they were experiencing these natural places; think back to Sibu's comment (presented in Chapter 5), “for many of us, the opportunity was a sort of awakening from a deep sleep . . . one was able to start appreciating the beauty of nature”. One should not underestimate the importance of such thoughts (this was not an example of ‘received curriculum’!). If a goal of environmental education is to promote an attitude of concern for the natural world and for environmental problems such as diminishing bio-diversity and loss of indigenous habitat, it is important to make educational use of direct, in contrast to vicarious, experiences of bio-diverse settings. It is all the more important when the students concerned have had few experiences of such places.

The Hobitton excursion provides opportunities to encourage students to consider how natural settings, including their diverse forms of life, are thought about by people, including themselves. Sections of the Hobitton site such as the tract of indigenous forest are examples of ‘protected areas’, maintained as sites of indigenous bio-diversity. From a vantage point above the forest, one looks out over the protected forest to a rural vista of homesteads, small-scale farming activities, soil-eroded dongas, and people struggling to obtain resources such as water and fire-wood fuel. This vista offers a real (as opposed to vicarious) opportunity to enable students to critically examine intersections among social, political, and bio-physical features of the South African environment. There are numerous questions which can prompt discussion on these intersections. For example, why is the forest (an example of nature relatively undisturbed by human influence), with its abundance of potential firewood, not accessible to local people for resource extraction? In the face of such a question, how might policies of ‘nature conservation’ be justifiable, if at all, in a rural African situation where people struggle to meet basic resource requirements? What
are students' thoughts on the matter? How might they present these dilemmas to pupils in their teaching?

In conclusion, students' responses in the interviews indicated a rich source of perspectives on human-nature relationships, as demonstrated in the previous chapter. The Hobitton excursion, in particular, provides valuable direct experience of natural settings as well as a highly suitable context in which to engage students in thinking about social and political issues and human interaction with the natural world.
CHAPTER 7
Discussion, conclusion, and implications

Introduction

The purpose of the study was to portray students' conceptualisations of environment and environmental education (first question), and human-nature relationships (second question). To this end, interviews were conducted with students engaged in a teacher education program which incorporates mandatory environmental education sessions. Students' experiences of these sessions were also described (third question). The outcomes of analyses of the data with respect to the first two questions underlie the study's knowledge and value claims. Being the only portrayal of students' conceptualisations of environment and human-nature relationships of which I am aware, they make a substantive contribution to the literature.

The study also contributes to research methodology and pedagogy in environmental education. With respect to methodology, it departs from a currently popular quantitative approach to research in environmental education and contributes by presenting an argument for interpretive research, an example of the sort of insights which this approach may yield, and a role for meta-interviews. The pedagogical contribution of the study is to inform the practice of incorporating environmental perspectives within teacher education in two respects. First, it provides insights into how students experienced environmental education sessions in the Rhodes University teacher education program. Second, using these insights and the outcomes of the first two questions, this chapter proposes a pedagogical approach for environmental teacher education.

This chapter is based on these inter-related contributions, and consists of four sections. Three sections consider the outcomes in relation to the contributions made by the study—substantive, methodological, and pedagogical—and the fourth section concludes with suggestions for research.
I. Substantive contribution: Students' conceptualisations

This section reviews the study's outcomes with respect to the first and second research questions. The interest here is with the content (i.e., substance) of the conceptualisations portrayed in Chapters 4 and 5, especially with the relation of these conceptualisations to arguments and approaches developed in the literature.

Conceptualisations of environment and environmental education

Concerning the first research question, five conceptualisations of environment and associated beliefs on environmental education were presented. They portray how students visualised, thought about, or understood the term environment. In two cases, attention was focussed on the human world: in a political conceptualisation, there was an explicit interest in the influences of power relations among various groups defined on economic and racial terms. In a social conceptualisation, the interest focussed on interpersonal interactions and some cultural issues. In the third case, the focus of attention was directly on bio-physical features of one's surroundings. Two other conceptualisations, namely ‘environment as integrated systems’, and ‘environment as part of one's self’, portrayed ways in which students conceptualised the environment.

The environment as we know it exists only as it is experienced and reconstructed in the mind (Hart, 1979) and a first conclusion arising from the study is that students collectively espoused qualitatively different ways of thinking about the environment and environmental education. A factor which likely contributed to the diverse perspectives within the conceptualisations was the markedly different personal histories of student participants. Some had been raised in ‘black’ townships with notoriously high incidences of crime and violence, had been on the receiving end of discriminatory policies which had restricted their access to resources such as land and water, and had little or no experience of undisturbed natural settings. Others, by contrast, had been raised in relatively affluent and
peaceful situations which allowed them access to both resources and a variety of opportunities to experience natural settings. Bearing in mind the discrepancies which characterise the South African social landscape, these students had experienced markedly different environments and they drew upon these personal experiences in their interview responses.

The extent of differences among the conceptualisations varies according to which categories one contrasts. The social and political conceptualisations are closely related, as both concern social interaction. There is more difference between the social and bio-physical conceptualisations: where the former focusses on the human world of social issues, the latter focusses on, and is primarily concerned with, the natural (as in non-human) world. These approaches to thinking about one's surroundings were evident in the sorts of environmental issues which students raised for consideration in their questionnaire responses at the start of the program. Associated with these issues were beliefs about an appropriate curriculum for environmental education, the purpose of which would be to address those issues. From the standpoint of a social conceptualisation of environment, for instance, social conditions of one's surroundings constitute the environmental issues which should be taken into account. Likewise, from the stance of a political conceptualisation, an environmental education curriculum should address ways in which social policies organise (i.e., constrain or enhance) people's access to bio-physical resources. And from the stance of a bio-physical conceptualisation of environment, the sorts of issues which students thought should be addressed were those which concerned human impact on the natural world.

When I used a similar questionnaire with Canadian student teachers in an environmental education course at the University of British Columbia in 1993, without exception, each environmental issue suggested by the students directly concerned human impact on relatively unspoilt natural settings. For example, most students raised the 'disappearance of old growth forests' as an environmental issue of concern to them; not
one student raised a social issue (such as, arguably, the associated issue of forestry-worker unemployment). This probably illustrates the mediating role of social context in the perception of environment and environmental issues. As discussed in the first chapter, environmental issues have been defined in North America largely in terms of the restoration and protection of nature. This is how they are often portrayed in the media. However, proposing that it “is impossible to achieve a healthy and clean environment without justice”, Alston (1993) argued in the What it Means to Be ‘Green’ in South Africa conference that powerful environmental organisations in the United States have tended to de-emphasise issues affecting ‘non-white’ and economically-poor communities largely because these organisations derive most of their support from ‘white’ affluent citizens. This may explain how a particular conception of environment and environmental issues has become widespread in North America. Guha (1989) argues that this conception is unlikely to serve the interests of economically-impoverished people. Defining environment as “not just endangered species, but where we live, where we work, and where we play”, Alston (1993) proposes, rather, that “our housing, water, and day-to-day survival issues are environmental issues” (p. 187). This approach to thinking about environment, as the intersection of daily social life with features of the natural world, was how some of the students in this study conceptualised environment and environmental issues.

Thus, diverse approaches to thinking about environment, environmental issues, and environmental education were ‘present’ within the class prior to instruction on these topics. Some of the conceptualisations correspond to what one may refer to as a currently widespread ‘green’ approach, while others associate more closely with issues of social justice. Taken together, the conceptualisations include elements of the range of perspectives being advanced by both environmentalists and environmental educators in the literature. These findings lead to the following conclusion:

• Students’ pre-instructional beliefs exhibited important elements of conceptions of environment and environmental education described in the literature.
This conclusion has implications for research in environmental education and for the environmental education of student teachers; these are considered more fully in the second and third sections of this chapter. The following sub-section considers the substantive outcomes with respect to the second research question.

**Conceptualisations of human-nature relationships**

Thirteen conceptualisations of human-nature relationships were presented in Chapter 5 as outcomes of the second research question. These were:

- **Shared processes of origin**
- **Conceptualisations of human-nature connections:**
  - Science-based connections
  - Humans separate
  - Humans becoming alienated
  - Humans psychologically connected
- **Conceptualisations of intrinsic value:**
  - Awareness-based
  - Life-based
  - Ecosystem-based
  - God's purpose-based
- **Conceptualisation of inherent value:**
  - Aesthetic appreciation
- **Conceptualisations of instrumental value:**
  - Humans as custodians and preservationists
  - Wise-use
  - Therapeutic value

Remember that these conceptualisations portray students' untutored beliefs about human-nature relationships, insofar as discussions on this topic during the teacher education program did not precede the interviews. The first five conceptualisations portray how students thought about this relationship broadly and the remaining eight portray conceptualisations organised on the basis of values which students attributed to the natural
world, or parts thereof. Both the content and the range of these conceptualisations have implications.

The outcomes of the second question portray elements of students' eco-philosophies. Eco-philosophical perspectives were reviewed in Chapter 2, using Fox's (1990) typology which organised perspectives on human-nature relationships in two categories, psychologically-based and value-based.

A first conclusion is that students collectively espoused elements of these psychologically-based and value-based approaches in their interview responses. For example, in the category 'conceptualisations of human-nature connections', students' perspectives on human-nature relationships resemble those promoted by deep and transpersonal ecologists (Devall & Sessions, 1985; Fox, 1990; Naess, 1973). Associations between students' perspectives and the literature were made during elaboration of the category (e.g., p. 133).

Likewise, each of the value-based conceptualisations—intrinsic, inherent, and instrumental—contain elements of approaches developed in the literature. Fox's (1990) typology of intrinsic value arguments, for example, contains three categories: ethical sentientism, life-based ethics (including ecosystem ethics), and cosmic purpose ethics. Arguments on ethical sentientism have much in common with those presented in the conceptualisation 'awareness-based intrinsic value'. Indeed, some of the attitudes, values, and beliefs which students espoused closely resemble arguments in the literature. Consider views illustrated within excerpts presented in 'awareness-based intrinsic value', where Jennifer includes sentient non-humans with humans as deserving of respectful treatment (p. 151). Just as she resents being dominated ("imposed on", in her words) by other people, so she attempts to act in ways which diminish the extent of her own imposition on sentient non-humans. She rejects, in other words, acts of unjustified domination—of sentient non-human animals as well as of humans—by humans. These views closely resemble arguments made in the ecofeminist ethics literature. Ecofeminist ethics are
grounded in the assumption that the domination of women and of nature are linked and ought to be eliminated (Kurth-Schai, 1992; Merchant, 1980; Warren & Cheney, 1991). Warren and Cheney argue that ecofeminism involves the critique of interrelated social “isms of domination”, such as sexism, racism, and naturism (the unjustified domination of non-human animals and nature by humans). The ecofeminist literature is concerned to develop:

... those descriptions and prescriptions of social reality that do not maintain, perpetuate, or attempt to justify social ‘isms of domination’ and the power-over relationships used to keep them intact. (Warren & Cheney, 1991, p. 181)

Some students were explicit in their concern for the inter-relatedness of social and environmental justice and elements of these approaches to human-nature relationships were evident in their responses. The same can be said broadly of students' beliefs about the natural world in terms of instrumental value, although the content of their responses reflected only a few of the instrumental value arguments reviewed in Fox (1990).

As the analysis proceeded it became apparent that the content of students' thoughts had much in common with perspectives developed in the eco-philosophical literature, and this is reflected in the manner in which the conceptualisations were developed and organised. While the content of students' conceptualisations do not correspond exactly with arguments developed in the literature, they include sufficient elements to support categorisation in this fashion. Thus:

- **Students' pre-instructional conceptualisations of human-nature relationships traverse a range of eco-philosophical perspectives and include elements of many of the categories developed in this literature.**
As the content of these conceptualisations reflect, in part, the contextual features of the research setting, a discussion of the relationships between the context and the outcomes follows.

**Context and the content of the outcomes**

Efforts were made throughout the interviews to establish an atmosphere in which the student felt that all of his or her responses were appreciated as valuable contributions to the study. Outcomes of the meta-interviews support the claim that this atmosphere was achieved and that students felt free to speak honestly. Thus, the context of the interviews was of a more ‘personal’ flavour, than (by way of contrast) an ‘academic’ flavour.

The study's interest in cognition lies in *how* students thought about human-nature relationships. Within a personal context, then, students espoused thoughts on human-nature relationships which traversed a range of eco-philosophical thought. Had the interviews been conducted differently, this outcome may well have been different and future research may reveal the mediating influences of context on students' conceptualisations.

For example, features of a social context may influence people to frame human-nature relationships in order to appear more credible to their audience. In an essay on conceptions of human-nature relationships embedded in *Silent Spring*, Evernden (1993b) argues that Carson framed her arguments in terms of enlightened human self-interest rather than in the intrinsic value of nature as a strategy to enhance the book's popularity not only to nature-lovers, but to a far wider audience. While the book's popularity attests, in part, to the success of this strategy, Evernden concludes that a more insidious effect was the reinforcement of a particular way of understanding nature - “as a stockpile of essential objects for humans to use” (p. 211). A conception of nature “as object”, after all, is widespread in Western industrialised societies and Evernden (1993a) writes of “resourcism” as a “modern religion which casts all of creation into categories of utility”,

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transforming all human-nature relationships into a “subject-object or user-used” dichotomy (p. 23).

The outcomes demonstrate the existence of diverse ways of thinking about nature in the students' responses, including alternatives to an emphasis on resources. This diversity is partly a consequence of the interview context, because particular ways of conceptualising nature were neither pre-figured nor seen as more credible than others. Underlying Jennifer's concern for animal abuse, for example, was a different way of “seeing” animals (that is, thinking of them) (p. 152). She did not conceptualise these creatures as objects totally removed from her sense of self. Evernden (1993b) argues that some approaches to conceptualising nature and its parts are censored, in effect, by widespread social beliefs. Nonetheless, such alternative understandings of nature, he claims, are growing in popularity. They were certainly evident in the students' responses.

These arguments lie at the heart of the rationale for this study: implicit in how one acts in relation to the natural world are ways of thinking about human-nature relationships—about how one should act, and why. In Evernden's (1993b) terms:

The question one asks of nature-as-object is “what's in it for me?”; whereas of nature-as-self one might ask “what is it to me?”. The former implies simple exploitation... while the latter implies a concern with the relationship of humans and non-humans. (p. 214; emphasis in original)

Evidence presented in the study suggests that some students did not conceptualise particular forms of life as objects, but rather as subjects more akin to themselves. As Jennifer commented, there is a tendency to devalue these thoughts as ‘sentimental’ and excessively ‘subjective’ when they are articulated in public, even to close friends and family members. Yet, those publicly devalued experiences of non-humans clearly influenced how she interacted with the natural world. The point here is that the interview context was such that she was able to articulate these views with confidence.
Regarding the environmental education of student teachers, these outcomes prompt one to consider which conceptions of human-nature relationships are being promoted, whether explicitly or implicitly, within a program curriculum and how these conceptions relate to students' personal perspectives. Gough (1990) argues that many approaches to environmental education embody objective conceptions of nature. If this is the case, it would help explain why incongruities often emerge between learners' personal understandings and those more widely accepted in public discourse (Evernden, 1993a). Some of the conceptualisations portrayed in the study lend credence to this situation. This prompts the question: should a particular conception of human-nature relationship be promoted within the discourse of an educational program? This curriculum issue is further explored in the third section of this chapter. In the following section, attention shifts to the study's contribution to methodology in environmental education research.

II. Methodological contribution: Qualitative environmental education research

The study questioned the assumption of student ignorance with respect to an environmental education curriculum. Qualitative research methodologies and a constructivist epistemology offered appropriate theoretical frames for research designed to explore students' personal beliefs, and arguments for this approach to research in environmental education were presented in Chapter 3. This section highlights two aspects of the study's methodology: the necessity for a supportive elicitation context and the use of meta-interviews.

A supportive elicitation context

The previous section claimed that students' pre-instructional knowledge on environment, environmental education, and human-nature relationships includes diverse
perspectives developed in the literature. This knowledge was elicited from the students by means of a research process which set out to explore their personal beliefs. The research began with the hypothesis that they would think ‘something’ about these topics, and the goal was to elicit and describe ‘what’ they thought. Its purpose was to explore the content of students' thinking and not students' interpretations of the researcher's (or some other party's) thoughts on these topics, and this permeated the data collection process.

It was necessary to avoid pre-figuring the sorts of responses the students either made or felt they should make in the interviews. Two aspects of the data collection phase, namely the elicitation strategies adopted in the interviews and the rapport established between interviewer and interviewee, were essential to attain this goal. Concerning the former, the data collection process began with open-ended questions in the class-wide questionnaire. The format of these questions enabled students to choose their responses and my task was to assist them to articulate their beliefs. This included a blend of reflexive questions—those referring back to the students' previous statements—and further open-ended questions. Strategies such as the ‘cards’ exercise and an interview conducted in a natural setting provided opportunities to pose open-ended questions which encouraged students to articulate thoughts on humans and nature. While some students initially thought that the interviews were to be a test of their ‘environmental knowledge’, during the interview process they all came to realise that their own ways of framing the topic under discussion were being valued, both as credible ways of thinking and as worthwhile contributions to the study.

Concerning how students felt in the interviews, I attempted to establish a friendly, supportive atmosphere. This necessitated the development of a rapport, part of which was achieved during the actual interviews and part through various opportunities during the program. Multiple interactions were necessary to achieve this atmosphere. During the Hobitton excursion, for instance, I was careful to avoid presenting myself as an ‘aloof researcher’; I acted, rather, as one of the class. Such experiences contributed to the
establishment of an interview situation which, the meta-interviews suggest, was more conducive to the discussion of personal beliefs.

Students struggled to articulate their beliefs during the interviews and these difficulties possibly arose from limitations in the elicitation strategies: questions posed in the interviews were only broadly pre-determined and it was necessary to focus considerable attention on what the student was saying during the interview, consider these responses in terms of the research questions, and pose questions which enabled them to elaborate. An additional factor underlying why some students struggled to articulate their views may have been their educational background: some had experienced strongly transmissive teaching styles throughout their education. Sibu, for example, described how he had "never been exposed to speak out" in a class setting in the way that he was being encouraged in the teacher education program, let alone in the interviews. Also, many of the students had never been in a situation where their views were being probed in a non-judgemental manner; quite simply, they were not used to articulating their thoughts in a sustained manner. When students were asked to reminisce about a teaching style which they had appreciated during their own school years, I was struck by how often they remembered particular teachers who had listened to their views and, consequently, who they felt had treated them 'as people'. These teachers were remembered as isolated cases in predominantly transmissive educational experiences.

The difficulty students experienced in making their thoughts explicit was exacerbated by their lack of familiarity with discussions on the research topic. One should bear in mind the absence of inquiry into human-nature relationships and the pervasive emphasis on disciplinary knowledge in school curricula (Gough, 1989; Orr, 1992). As Gough (1989) describes:

... learners' own perceptions of their environment are often disregarded by teachers, who see such perceptions as distractions from the transmission of socially-validated knowledge. (p. 228)
Teachers' disregard for learners' 'own perceptions' is apparent in the lack of research on this topic in the environmental education literature. This disregard, in turn, stems partly from perspectives on learning and the place of students' knowledge in the educational process, and partly from methodological perspectives. Given the study's theoretical perspective on learning—one which attaches importance to students' pre-instructional knowledge—the choice of a qualitative methodology was clearly appropriate. Indeed, the constructivist perspective encourages an empathy and respect for learners' manifold realities.

Thus, the adoption of a theoretical perspective on learning preceded the choice of the study's methodology; this methodology, in turn, influenced all phases of the study. The following sub-section considers the credibility of its outcomes and the supportive role of the meta-interviews.

A role for meta-interviews

An overall claim of the study is that its outcomes portray students' conceptualisations. These outcomes resulted from a qualitative research process which involved myself interviewing students on an individual basis. Maxwell (1992) poses a question which goes to the heart of research such as this one: "All fieldwork done by a single fieldworker invites the question, Why should we believe it?" (p. 279). The following discussion revisits arguments made in support of the study's claims to validity, to argue for meta-interviews as a means of enhancing internal validity. Meta-interviews, after all, are not commonly included as components of qualitative research studies.

Judgements on validity must be made in the light of a study's theoretical frame. Theoretical frames in education research may vary; as Cherryholmes (1988) argues, "different discourses produce different truths. There are other research traditions." (p. 107). Following a review of research traditions, this study was embedded within a qualitative research tradition and a constructivist epistemology. In terms of this theoretical
frame, reality is considered to be a "multiple set of mental constructions . . . made by humans" (Merriam, 1988, p. 295). To make judgements on the validity of interview-based research, the onus rests with the researcher to demonstrate persuasively that he or she has represented those multiple constructions adequately (Cherryholmes, 1988; Merriam, 1988). Three features of this study have been offered as "good reasons" to support the internal validity of its outcomes (Lythcott and Duschl, 1990, p. 14):

- an account of the conduct of the interviews, from the researcher's perspective;
- an account of the conduct of the interviews, from the students' perspectives;
- the practice of inviting member-checks of drafts of the analyses.

These accounts are not revisited in detail here as they are presented in Chapter 3. However, because the meta-interviews proved to be particularly useful in providing a source of insight into how students experienced the interviews, and because they are not commonly undertaken in interview-based studies, their supportive role is emphasised here.

The meta-interviews provided a means of assessing my interpretation of the conduct of the interviews, and I believe this was especially necessary in this study given the diverse personal histories of the student participants and the sorts of beliefs which were being probed. While I was familiar with the Southern African context, having lived in South Africa and Swaziland, the students and I were nonetheless from diverse cultural and linguistic backgrounds. While my familiarity with the setting undoubtedly contributed to the empathy which I was able to convey during the interviews, the possibility existed that my perceptions of honesty and openness may have been misguided. The students may have felt otherwise.

In hindsight, the meta-interviews were especially valuable for the evidence they provided in assuring me that the students experienced the interviews as I had intended. The third data set provided supporting evidence for three claims describing the interview context. Important among these, in terms of the study's knowledge claims, were that
students experienced the interviews as a process of ‘exploration of themselves’ and that they felt free to speak honestly. Students made these comments to an independent researcher within two months of the second data set interviews, aware that I had left the research setting (indeed, the continent!). When all is said and done, the honesty of the dialogue between researchers and participants is critical to the quality of the results of an interpretive study (Brickhouse, 1992, p. 99). This was especially critical in this study which explored students' personal beliefs on highly value-laden topics.

Unlike much qualitative research in science education which explores students' knowledge of relatively impersonal phenomena, such as light and sound, this study explored some beliefs that at times intruded upon the student's privacy. Some of these beliefs were near and dear to the students, as some of them commented in the meta-interviews. Gavin, for instance, observed that the research, in probing aspects of his sense of self, was invasive. And Lara commented that, “you don’t just divulge these (personal and private beliefs) to anybody” (p. 85). Since they were able to influence the direction of the interviews, students realised that the ‘right’ responses were those that were the most honest. Further, the friendly and non-threatening rapport provided the context in which they were willing to ‘go public’ with these personal thoughts. This included those beliefs which, as Jennifer commented, were seen as “ridiculous” by friends and family members (p. 152). The context of the interviews, in other words, enabled students to discuss their personal thoughts. Thus, the meta-interviews provided more than a ‘check’ on my account of the interview context; they also enhanced the persuasiveness of that account.
III. Pedagogical contribution: Engaging students' beliefs

Educational researchers seek to produce warranted assertions that can be used to improve educational efficacy by guiding events toward desirable 'ends-in-view', our shared vision of improved education. (Garrison, 1994, p. 11)

This section considers the outcomes from a pedagogical standpoint and deals with the following topics: the relevance of students' pre-instructional knowledge, the place of eco-philosophy within the environmental education of student teachers, and the question of whether particular conceptions of human-nature relationships should be promoted in education programs. Finally, the research outcomes, as “warranted assertions” (Garrison, 1994, p. 11), are used to support a proposal for an approach to the environmental education of student teachers.

The assumptions of student ignorance and of shared meanings

In Chapter 1 a quotation advising university teachers to assume virtual environmental ignorance on the part of their university students was inserted to exemplify perspectives on learning, research, instruction, and curriculum which were the antithesis of those being promoted in the study. After all, if students are ignorant there is no need for interpretive research to explore their pre-instructional beliefs. They either know nothing, or what they do know is irrelevant to the educational venture and need not be taken into account by instructors. Further, an assumption of student ignorance is consistent with a conception of an environmental education curriculum as comprising knowledge which can only be gained through formal academic study at the university level. These three issues—the place of students' knowledge in instruction (including views on learning), the worth of interpretive research, and the place of students' personal beliefs in an environmental education curriculum—are inter-related concerns of this study.
Having adopted a constructivist perspective on learning, the study set out to elicit and portray students' pre-instructional knowledge. Given differences between its theoretical frame and those of a currently widespread information-oriented approach to environmental education (Robottom, 1991), the study's demonstration of a rich and diverse student pre-instructional knowledge base was not unexpected. The outcomes certainly substantiate criticism of the pedagogical advice that university teachers should assume virtual environmental ignorance on the part of their students. They show that students, considered collectively, begin their teacher education program "in midstream" (Gowin, 1981, p. 23), rather than high and dry in the catchment area of the academy! This conclusion has been reached on numerous occasions in the field of science education, as well as in studies of students' pre-instructional knowledge on teaching and learning (Chapter 3). However, being one of the few instances of qualitative research in environmental education, the study presents evidence in support of such a claim with respect to an environmental curriculum.

The outcomes highlight the pedagogical inappropriateness of instructors assuming shared meanings between themselves and their students when environment and environmental issues are discussed in a teacher education context, at least in the South African situation. While students often included elements of academic studies in their responses, the sort of knowledge which the study elicited was not the sort of knowledge which could be gained through academic studies alone. Much of the knowledge which students presented in the interviews derived from experiences in their surroundings. Although some students may have heard of environmental education for the first time in this program, they had still experienced their environment, or surroundings; however the world about them was labelled. These students were from diverse cultural and socio-economic backgrounds, and this diversity undoubtedly contributed to the richness of the outcomes. A pedagogical implication is that instructors should devote considerable attention to the conceptual clarification of this key concept.
Eco-philosophical inquiry in environmental teacher education

An argument for the relevance of students' conceptualisations of human-nature relationships was made in Chapters 1 and 2 and is re-visited here to stress two aspects. First, students will invariably convey perspectives on human-nature relationships in their teaching practices. Hence, environmental sessions within teacher education should inform students about eco-philosophical arguments. This would both increase their awareness of perspectives implicit in their own practices and enable them to attend to their pupils' views with greater empathy and understanding. Second, an aim of encouraging students to examine their own beliefs is to make them explore why they might wish to promote 'concern for the environment' in their teaching practice.

One should bear in mind that the promotion of environmental education in schools relies upon teachers incorporating perspectives and practices within their teaching situations. The implementation of environmental education perspectives within school curricula, in other words, is contingent upon teachers' personal support and commitment. One cannot assume such commitment, especially when environmental perspectives are being promoted as mandatory curriculum experiences for student teachers. Some may begin the program never having heard of environmental education and, more importantly, may not be familiar with arguments as to why it should be promoted at all. Indeed, the study suggests that some students espouse little concern for issues of the natural world, and only focus on such issues when they associate closely with human needs. If environmental perspectives are to be promoted within teacher education, these programs need to promote students' commitment to a wider range of issues. This promotion should be done in a manner which involves meaningful learning.

A commitment to environmental education may be enhanced through engaging students in the eco-philosophical literature. A purpose of this literature is to promote sustainable interactions between humans and the natural world by developing arguments for how humans may value the natural world and, consequently, act appropriately. This
literature, therefore, has the potential to inform student teachers; both to elaborate upon their own perspectives, and to prompt them to consider other approaches to human-nature relationships which underlie sustainable human-nature interactions, so that they may educate pupils toward such ends.

In the teacher education program where the research was conducted, theoretical inquiry into human-nature relationships was not a component of the environmental sessions: indeed, scant reference was made to the eco-philosophical literature. This reflects the situation within environmental education at large: for example, within its journals, there is little discussion on the place of eco-philosophy within educational curriculum, let alone debate on particular approaches to eco-philosophy. The following discussion continues with this latter issue.

**On the promotion of particular eco-philosophical approaches**

Some authors propose that particular eco-philosophical approaches should be promoted in educational programs (Devall & Sessions, 1985; Evernden, 1993a). Gough, (1990), for example, proposes that “education for a healthier planet” must invite criticisms of ways of thinking of humans as separate from nature, and encourage a sense of kinship with the natural world (p. 14). From an educational perspective, this begs the question: Should certain approaches to human-nature relationships be treated as ‘correct’ or ‘more suitable’, hence more worthy of promotion, than others? In this respect, what should an environmental education program educate for? The goal of developing environmentally-responsible behaviours was rejected in Chapter 3, on the grounds of incompatibility with educational theories on meaningful learning. Nonetheless, even if attention is given to students' beliefs, environmental education programs may still indoctrinate, if they aim to inculcate ‘correct’ attitudes and values and replace ‘wrong’ views and beliefs (Kauchak, Krall, & Heimsath, 1978, p. 19).
An analogy can be made with research in the fields of science education and teacher education, where particular conceptualisations have been favoured by educators as resembling propositions or teaching actions they wish to promote. Alternatively, some students' ways of thinking about teaching are seen as hindrances (Pajares, 1993) and, in the science education literature, some pupils' beliefs are seen as misconceptions (Chapter 3). Given a widespread consensus on scientific interpretations of the natural world, science educators have been able to compare and contrast students' conceptualisations with scientific knowledge. Insights derived from these research outcomes have been used to develop pedagogical practices designed to encourage students to re-conceptualise phenomena in ways more consistent with scientific interpretations: studies on conceptual change have received considerable attention in science education (Chapter 3). Such a degree of consensus is lacking in environmental education and this probably reflects a lack of consensus in its associated fields. In environmental ethics, for example, "no one set of ideas has been persuasive in convincing the majority of environmentally aware scholars that it holds the key to the right relationship to the environment" (Armstrong & Botzler, 1993, p. xv). It seems appropriate, therefore, to take students' 'sets of ideas' into account and use them as starting points. This approach can be supported on at least two other grounds: one being the increasingly multi-cultural composition of classrooms, the other being the need to intersect the action objectives of environmental education with students' personal perspectives.

Bear in mind that most of the eco-philosophical literature has been developed by authors in the industrialised democracies of Europe, North America and Australia. Given the increasingly multi-cultural composition of classrooms in South Africa, as in many countries, the promotion of particular eco-philosophical conceptions, especially those formulated in markedly different social situations, may be inappropriate for African curricula. There is little literature to substantiate this contention, although a recent paper by Burnett & Kang'ethe (in press) indicates that the literature, as currently developed, does not
represent approaches to human-nature relationships which may exist in Africa. Consider a summary of their research conducted with rural Kenyans:

For Bantu . . . . Wildlife is unnatural and alienated from human society which is natural. Wilderness is, consequently, understood to be fearsome and hostile, so it is not a place providing inspiration or self-actualisation.

(Burnett & Kang'ethe, in press, p. 1)

Thinking of humans as alienated from the natural world contrasts markedly with the proposal that humans should realise “a cosmologically-based sense of commonality” with the natural world (Fox, 1990, p. 256). Elements of an ‘alienated’ perspective were espoused by students in this study and one wonders how widespread this way of thinking might be in Africa, and among rural and economically-impoverished people in Europe and North America. Much of deep/transpersonal ecology, after all, has been developed by philosophers within economically-affluent and urbanised lifestyles. The adoption of an interpretive research agenda within environmental education would have the potential to portray the beliefs of those who live in markedly different social and economic circumstances and, in doing so, make important contributions to the literature.

Eco-philosophical approaches constitute more than a knowledge base alone: they may underlie how one acts knowingly in relation to the natural world. Much of the impetus within the environmental movement concerns the interest to change people’s outlook on the world, as a means to changing their actions (O'Riordan, 1981) and the deep ecology literature contains numerous normative implications for lifestyles (c.f., Devall, 1991; Devall, 1988). While environmental educators may themselves be sympathetic to these arguments, the question remains as to the educational defensibility of teaching for particular theoretical approaches, let alone particular actions or behaviours. Jickling (1992; 1991), in calling for “a proper distinction between environmental education and environmental
advocacy”, reminds educators of the necessity of distinguishing between approaches which educate and those which tend towards indoctrination.

Rather than favour a particular way of thinking about human-nature relationships in an educational program, I contend that it is appropriate to treat each as an approach to conceptualising human-nature interactions which, on the one hand, are meaningful to the students who espouse them and to the contexts in which they live, and, on the other, are building blocks of students' eco-philosophies. All but one of the arguments reviewed in Chapter 2 are appropriate for an environmental education curriculum, the exception being “unrestrained exploitation and expansionism”. And most of the conceptualisations portrayed in this study contain arguments for why people should act in a responsible manner in relation to the natural world. Whether these arguments derive from students' ethical stances (some of which were portrayed, for example, in the categories of intrinsic, inherent, and instrumental value) or from students' personal inclinations (such as views portrayed in the conceptualisation ‘humans psychologically connected with nature’), they are all ways in which students accounted for why they might act in an 'environmentally-appropriate' manner in relation to the natural world.

A conclusion of this study was that students' conceptualisations of human-nature relationships traverse the eco-philosophical literature, and include elements of its categories. This conclusion suggests that students would be likely to locate and recognise elements of their own eco-philosophical thought within this literature. This suggests a pedagogical approach to environmental education which is developed in the following section.

A pedagogical approach: engaging students' eco-philosophies

There is widespread agreement in the international community that “people's attitudes and practices” must change, to realise sustainable human-nature interactions (IUCN, UNEP & WWFN, 1990, p. 20). However, the problematic nature of educating
for behavioural or action objectives was discussed earlier. Education for action objectives can, nonetheless, be achieved through pedagogical strategies which are defensible on educational grounds only if these strategies are respectful of students' beliefs and engage them in meaningful learning. The conception of ‘action’ underlying this claim is a “behaviour with meaning” (Gowin, 1981, p. 4). Educational experiences should aim to “enable individuals to act intelligently” (Jickling, 1991, p. 173), in ways that are meaningful to them. As Jickling argues, educational experiences should not condition, coerce, nor indoctrinate learners to behave in certain prescribed ways. This educational value necessitates an indirect approach to the attainment of action objectives.

Robottom (1987b) proposed that professional development in environmental education should encourage participants to adopt a research stance toward their own beliefs and practices. This involves developing students' abilities to think critically about environmental issues. Critical thinking, in turn, involves the ability to make thoughtful judgements about what to believe or how to act (Bailin, Case, Coombs, & Daniels, 1993). Thoughtful judgements on actions with respect to environmental issues may be promoted through a three-phase teaching process, as follows.

The first phase involves eliciting students' personal beliefs: they must attempt to make these explicit. This process may be facilitated by interviewing each other, with the goal of describing elements of their colleague's beliefs in a short paper, which they then present to each other (an example of this process is elaborated in Appendix C). Pedagogical strategies to assist this ‘personal explication’ phase are essential; after all, teachers and students can only deal with what is explicit. This effort enables students to become aware of their own beliefs.

This phase is not an argument in support of the values clarification approach in education, especially its relativistic morass “according to which what matters is not whether what one believes is true or justified but whether one is ‘sincere’ and ‘genuine’ about it” (Kazepides, 1977, p. 103). Personal explication must be accompanied by critical
examination of the outcomes, in relation to ethical criteria (Frankena, 1973). That is, students should consider how their beliefs on human-nature relationships may contribute to the “care, nurturing, and enhancement of life” (Orr, 1992, p. 108). For life, specifically the maintenance and enhancement of cultural and biological diversity are, as Orr argues, defensible foundations for a liberal education.

Having begun to engage their personal thoughts in the program, the second phase involves students situating their views in relation to the pool of students' thoughts in the class and to approaches developed in the eco-philosophical literature. This phase exposes students to a wider pool of intellectual resources which, as Bailin et al. (1993) argue, is a necessary dimension of critical thinking.

The third phase involves students engaging collaboratively in the critical analysis of the various dimensions of an environmental issue, along the lines of ideological critique described in Fien (1993) and Robottom (1987a; 1987b). The focus on a particular issue sets a critical challenge that can provide a further impetus and context for critical thinking (Bailin et al., 1993, p. 53). What I am proposing amounts to a modification of the education for the environment conception: students' investigative efforts should include the identification of perspectives on human-nature relationships which are evident in the actions and statements of vested interest groups. Their analyses of the issue would then include an account of their own beliefs and choice of action in relation to the ‘unpacked’ dimensions of the issue. The ultimate goal of this three-phase process is that students would be better able to account for and justify their choice of action with respect to the issue. Rather than prescribe behaviours or particular theoretical perspectives, this approach to environmental education enhances a student's ability to explore, express, and account for why he or she has chosen a particular action concerning the natural world.
IV. A final word

This study has indicated that approaches to human-nature relationships discussed in the literature enhance one's understanding of assumptions embedded within conceptions of environmental education as well as inform the perspectives of environmental educators. It makes the case for incorporating students' personal perspectives on human-nature relationships in teacher education programs which promote environmental education and its outcomes suggest that approaches in the literature complement those perspectives. Consequently, encouraging students to consider these approaches in the light of their own beliefs may increase their commitment to promoting environmental perspectives in schools.

Given the lack of attention to qualitative research in environmental education, especially studies which explore student teachers' pre-instructional knowledge, this study is exploratory. It investigated students' personal perspectives on the broad topic of human-nature relationships within a Southern African context. Further, students' perspectives were portrayed on a collective basis. The focus was on the outcome space of their perspectives, rather than on case studies of individual students. A multiple case design (Yin, 1989), for example, has the potential to illuminate and complement the work reported here. This design would facilitate the study of questions related to the influence of context on the espousal of particular conceptualisations, the relationship of particular conceptualisations to different environmental issues, the extent of conceptual dispersion within and between students, and the prevalence of categories within social/cultural groups.

Future research will likely elaborate categories described in the present study and possibly add further categories. For example, this study did not describe an 'economic conceptualisation', yet this is a conceivable approach to thinking about the environment—placing priority on the importance of factors which contribute to economic sustainability as a means to enhance the quality of one's surroundings, for example. Also, conceptualisations within the category 'human-nature connections' are described in broad
terms and would benefit from further elaboration. As some students revealed in the interviews, feelings, notions, and thoughts on this topic are nebulous and difficult to articulate. Diverse elicitation strategies may facilitate this process of explication.

Ultimately, research of this genre would contribute to a phenomenography of human-nature relationships, portraying qualitatively different ways in which students—in diverse social and cultural contexts—conceptualise this relationship. Such research would result in the presentation of conceptualisations which, being derived from students reflecting upon the relevance of these thoughts to their lives, are likely to be more meaningful and relevant to peers elsewhere than those which are derived through philosophical and historical inquiry alone. In other words, this research would complement the relatively de-contextualised approaches described in the literature. It would also provide arguments and portrayals of this relationship derived from life in diverse social settings and cultural contexts. For instance, while one may locate descriptions of how Africans conceptualised human-nature relationships in the past—in pre-industrial, pre-late twentieth century—there is little in the literature to inform instructors of how their students, in this day and age, think about humans in relation to the natural world. In the final analysis, this research would increase understandings between instructors and students, both within and across social/cultural settings.

Given that a goal of environmental education is to influence people's actions, qualitative research may highlight conceptualisations which students find to be particularly compelling in terms of their normative implications. Responses to these questions will undoubtedly vary across social/cultural contexts. This would amount to more than a body of knowledge alone, for implicit within these descriptions are normative implications for action. As an educational goal, this would seem to be especially beneficial: not only are students encouraged to consider different theoretical approaches, but in the process of doing so, they are encouraged to consider the association between knowledge gained and their actions beyond the academic setting.
References


Appendix A - Class-wide questionnaires used in 1992 and 1993

All students in the 1992 and 1993 teacher education programs at Rhodes University were requested to complete a questionnaire: in 1992, this was administered by a Rhodes University staff member, and in 1993 by myself. Questions posed to the students are presented below; in both cases, lined spaces were provided below each question for the students' responses and additional paper was available.

Questions used in the 1993 Questionnaire

1. Describe the characteristics of a teacher whose teaching style you particularly liked:
2. What, in your view, are two important goals of education?
3. Staff in the Education Department here have an interest in encouraging environmental education in schools; What do you understand by ‘environment’?
4. What do you think a school programme in environmental education should seek to accomplish?
5. Please describe one or two environmental issue(s) in Southern Africa of particular concern to you. Which aspect concerns you?
6. What interests / hobbies do you actively pursue?
7. Any comments?

Questions used in the 1992 questionnaire

1. Why do you want to become a teacher?
2. Describe the characteristics of a teacher whose teaching style you particularly liked.
3. What does the word ‘education’ mean to you?
4. There are six illustrations on the separate attached sheet. Select one which best captures for you the way in which you feel a teaching-learning situation ought to occur.
For your selection, describe which aspect of the illustration for you represents desirable teaching.

Which aspect of the illustration for you represents desirable learning?

5. Staff in the Education Department here have an interest in encouraging environmental education in schools; What do you understand by ‘environment’?

6. What do you think a school programme in environmental education should seek to accomplish?

7. What are some strategies that you consider would be effective for teaching students about environmental concerns?

8. What interests/hobbies do you actively pursue?

9. Do you have any additional comments concerning particular questions, or this questionnaire in general?
Appendix B - Some of the questions posed in the meta-interviews

The following is a list of some of the questions posed by Dr. Kevin Kelly in the meta-interviews of the third Data Set. The interviews were based on a semi-structured format, allowing the interviewer to follow the student's responses with appropriate questions. All of the students responded to each of the issues raised by these questions.

- What do you think Alistair was trying to achieve in his research?
- What was it like in the interviews? / What was it like being interviewed?
- What sort of questions did he ask? Can you give me an example of the type of thing he was focusing on?
- Did you ever feel like pulling out of the study?
- Do you think he was interested to hear particular things?
- Did you ever feel like you should answer his questions in a particular way?
- Do you think you ‘held back’ in your responses?
- Do you think his questions guided your views? / Did you ever have the feeling that his questions put ideas into your head?
- Did you value, in any way, being involved in the project?
- Do you think the research influenced the way you think about things?
Appendix C - Example of proposed pedagogical approach

The following is excerpted from a class handout provided to student teachers at the start of an environmental education course. It is provided as an example of how one might engage students' beliefs on human-nature relationships at the start of an environmental education program. Thus, it elaborates briefly on the approach proposed in Chapter 7.

Neil Evernden (1993) contends that "how we act toward the non-human is a consequence of our beliefs about how we should act and about what we are acting on", and Bob Jickling (1991) proposes that "questions about who we are" and "our attitudes to non-human components of our environments" are fundamental to the educational consideration of environmental issues. This assignment asks you to consider two questions:

"How might a colleague think of him/herself in relation to the natural world?" and,

"What of my own views?"

The intention here is not to request a final and definitive statement, but rather to promote an ongoing process.

First, to facilitate discussion of these rarely-asked questions, compile an ‘environmental box’. This entails bringing to class a container/box (of whatever form) in which you have placed four ‘things’ representing (some of) your perceptions, attitudes, thoughts concerning ‘environment’. You may wish to develop a theme to communicate particular areas of personal interest to at least three colleagues. Be prepared to share your thoughts, and listen to different perspectives!

Second: Work in groups of two, through two steps. Begin by, interviewing each other. It may ease matters if you speak in relation to a particular environmental issue. It is imperative that you make strenuous attempts to be honest in this interview! Using either
notes or a tape recorder, compile a short report on your interpretations of how your colleague understands how he/she relates to other living beings and to non-living features of environment. Make at least two copies of your ‘Step 1 report’, and hand one copy to your colleague.

**Step 2:** Reflections by the ‘researched’ on the report on their views. For this second phase, compile a short report describing your reflections upon reading your colleague's analysis. You may wish to discuss your responses first. Present this Step 2 report together with the Step 1 report.

‘Unpacking’ an environmental issue
Work in groups of four or five. Identify a local current environmental issue of mutual interest to group members, and negotiate your choice with the instructor prior to proceeding. Forms of data collection may include, on the one hand, personal interviews of stake-holders, specialist experts, and those individuals concerned with the issue to the extent that they are taking some form of action in respect of the issue. Also, you will need to analyse documents pertaining to the issue: these may include newspaper articles, video-records, minutes of meetings of relevant committees and science-based literature. The overall intention of this assignment is to ‘unpack’ the issue, in order to clarify its various dimensions. Results of this process will be presented in class and in the form of a written Report.

In your group's Report,

i) provide an overview of the problem, and its various dimensions;

ii) provide a brief (point-form, or Table) review of the sorts of materials you obtained, and how these were obtained;

iii) identify the major stakeholders in the issue - protagonists, affected community members, decision members;
iv) present the arguments on which the different stake-holders' different perspectives on the issue are based;

v) analyse these arguments in terms of their vested human interests. Consider questions such as "Who stands to benefit from a particular decision?", etc;

vi) each group member should indicate your own position on the issue. If your reasoning in this section relates to perspectives advanced in Assignment #1, then try to make these explicit.